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Stuart G. Hibben, Editor

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The present volume contains material accessioned between October 1991 and September 1992. It contains full citations of 5340 items, in many cases with abstracts. Indexing for the volume is issued as Volume 46, Part 2.

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Library of Congress

46-1
Possibility of regulating the water absorbing capacity of soil with the aid of a snow fence. [Vozmozhnosti regulirovaniia vodopoglotitel'noi sposobnosti pochvy s pomoshch'iu snegozaderzhaniia].
Shutov, V.A., et al. *Leningrad. Gidrologicheskii institut. Trudy*, 1990, Vol.334, p.18-30, In Russian. 15 refs.
Kaliuzhnyi, I.L.
Seepage, Snow fences, Soil water, Soil temperature, Soil physics, Snow water content, Soil mechanics, Snowmelt, Analysis (mathematics).

46-2
Effect of ice cover thickness on the load from unbroken ice cover during its thermal expansion. [Vliianie tolshchiny ledianogo pokrova na nagruzku ot sploshnogo ledianogo pokrova pri ego temperaturnom rasshireniı].
Semenov, IU.A., *Leningrad. Glavnaia geofizicheskaia observatoriia. Trudy*, 1990, Vol.532, p.97-101, In Russian. 6 refs.
Ice cover thickness, Ice physics, Thermal expansion, Ice loads.

46-3
Effect of mesoclimatic conditions on thunderstorms and hail in USSR territory. [Vliianie mezoklimaticheskikh uslovii na grozy i grad na territorii SSSR].
Khaĭrullin, K.Sh., et al. *Leningrad. Glavnaia geofizicheskaia observatoriia. Trudy*, 1990, Vol.532, p.131-139, In Russian. 13 refs.
IAkovlev, B.A.
Climatic factors, Thunderstorms, Hail.

46-4
Vertical profiles of ice loads in the lower 500-meter layer of the atmosphere over the European part of the USSR. [Vertikal'nye profili gololednykh nagruzok v nizhnem 500-metrovom sloe atmosfery nad Evropeĭskoĭ chasti'iu SSSR].
Glukhov, V.G., et al. *Leningrad. Glavnaia geofizicheskaia observatoriia. Trudy*, 1990, Vol.532, p.188-195, In Russian. 16 refs.
Mytarev, M.N.
Ice loads, Wind velocity, Fog, Icing.

46-5
We've become trapped in the ice of pseudoscience. [My zastriali vo l'dakh psevdonauchnosti].
Vasciko, A., *Morskoĭ flot*, 1991, No.1, p.23, In Russian.
Ice navigation, Sea ice.

46-6
Biogeochemical indication of dissemination flows of gold-quartz in the cryolithozone. [Biogeokhimicheskaia indikatsiia potokov rasseianiia zolota zolotokvartsevykh mestorozhdeniĭ kriolitozony].
Taĭsaev, T.T., et al. *Akademiia nauk SSSR. Doklady*, 1991, 316(4), p.974-978, In Russian. 8 refs.
Arsent'eva, A.G.
Geochemistry, Geocryology, Gold.

46-7
Preserving resources of snow and ice. [Berech' resursy snega i l'da].
Kotliakov, V.M., *Akademiia nauk SSSR. Vestnik*, Jan. 1991, No.1, p.61-72, In Russian.
Ecology, Environmental protection, Global warming.

46-8
Advanced types of transport ships, their seagoing and ice navigation characteristics; collected scientific papers. [Perspektivnye tipy morskikh transportnykh sudov, ikh morekhodnye i ledovye kachestva; sbornik nauchnykh trudov].
Peresypkin, V.I., ed, Moscow, Transport, 1990, 156p., In Russian. For selected papers see 46-9 through 46-11.
Marine transportation, Ice navigation, Icebreakers, Ships, Ice loads, Analysis (mathematics), Ice growth.

46-9
Mathematical methods of determining ice loading on a ship's hull. [Raschetnye metody opredeleniia ledovoi nagruzki na korpus sudna].
Kurdiumov, V.A., Perspektivnye tipy morskikh transportnykh sudov, ikh morekhodnye i ledovye kachestva; sbornik nauchnykh trudov (Advanced types of transport ships, their seagoing and ice navigation characteristics; collected scientific papers). Edited by V.I. Peresypkin, Moscow, Transport, 1990, p.116-127, In Russian. 13 refs.
Ice loads, Analysis (mathematics), Ships, Icebreakers

46-10
Formula for determining ice passability and recommending optional hull forms for icebreakers and ice navigating transport ships. [Formula dlia opredeleniia ledoprokhodimosti i rekomendatsii po vyboru formy obvodov korpusa ledokolov i transportnykh sudov ledovogo plavaniia].
Tsoĭ, L.G., *Perspektivnye tipy morskikh transportnykh sudov, ikh morekhodnye i ledovye kachestva; sbornik nauchnykh trudov* (Advanced types of transport ships, their seagoing and ice navigation characteristics; collected scientific papers). Edited by V.I. Peresypkin, Moscow, Transport, 1990, p.141-144, In Russian. 3 refs.
Ice navigation, Ships, Marine transportation, Icebreakers, Analysis (mathematics).

46-11
Calculating the rate of growth of ice in a channel in modeling the movement of ships in river fast ice. [Uchet intensivnosti narastaniia l'da v kanale pri modelirovanii dvizheniia sudov v rechnom pripae].
Bogdanov, A.A., et al, Perspektivnye tipy morskikh transportnykh sudov, ikh morekhodnye i ledovye kachestva; sbornik nauchnykh trudov (Advanced types of transport ships, their seagoing and ice navigation characteristics; collected scientific papers). Edited by V.I. Peresypkin, Moscow, Transport, 1990, p.145-152, In Russian. 3 refs.
Ierusalimskiĭ, A.V.
Ice growth, Ice navigation, River ice, Ice models, Fast ice, Icebreakers.

46-12
Mathematical modeling of formation processes of spring flooding in Poles'e territory allowing for thaw phenomena. [Matematicheskoe modelirovanie protsessov formirovaniia polovodnogo stoka na territorii Poles'ia s uchetom ottepel'nykh iavleniĭ].
Kochelaba, E.I., et al, *Kiev. Ukrainskiĭ regional'nii nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1990, Vol.235, p.3-18, In Russian. 6 refs.
Okorskiĭ, V.P., Sosedko, M.N.
Mathematical models, Flooding, Thawing, Snowmelt.

46-13
Evaluating the dynamics of soil freezing and thawing in the Poles'e regions according to meteorological data. [Otsenka dinamiki pomerzaniia i ottaivaniia pochvy v Polesskikh raionakh po meteorologicheskim dannym].
Sosedko, M.N., et al, *Kiev. Ukrainskiĭ regional'nii nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1990, Vol.235, p.18-26, In Russian. 4 refs.
Kochelaba, E.I., Okorskiĭ, V.P.
Soil freezing, Ground thawing, Mathematical models, Soil physics, Meteorological factors.

46-14
Modeling the dynamics of snow accumulation in mountain catchment areas in the Ukrainian Carpathians. [Modelirovanie dinamiki snegonakopleniia na gornykh vodosborakh Ukrainskikh Karpat].
Sosedko, M.N., et al, *Kiev. Ukrainskiĭ regional'nii nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1990, Vol.235, p.26-33, In Russian. 7 refs.
Maslova, T.V., Kochelaba, E.I.
Snow accumulation, Mathematical models, Snow water content, Snow melting, Air temperature.

46-15
Possibility of forecasting wet snow avalanches in high altitude areas of the Ukrainian Carpathians with a 12-, 24, or 36-hour lead. [O vozmozhnosti prognoza lavin mokrogo snega v vysokogor'e Ukrainskikh Karpat s zablagovremennost'iu 12-24-36 ch].
Grishchenko, V.F., et al, *Kiev. Ukrainskiĭ regional'nii nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1990, Vol.235, p.100-110, In Russian. 4 refs.
Drukman, I.I., Negadaĭlova, T.N.
Avalanche forecasting, Wet snow, Analysis (mathematics).

46-16
Interaction between a reservoir and a partially flooded glacier: problems during the design stage.
Vischer, D., et al, Congrès des Grands Barrages, 17th, Vienna, 1991, Paris, Commission Internationale des Grands Barrages (International Commission on Large Dams), 1991, p.113-135, With French summary. 14 refs.
Funk, M., Müller, D.
Reservoirs, Dams, Glacier melting, Flooding, Calving, Water storage, Glacier tongues, Switzerland—Unteraargletscher

46-17
Effect of vegetation along a channel under extreme river discharge. [Einfluss der Vegetation im Gerinne bei extremen Abflussmengen].
Jäggi, M., et al, *Bundesamt für Wasserwirtschaft, Bern. Mitteilung*, 1991, No.4, Ursachenanalyse der Hochwasser 1987, Ergebnisse der Untersuchungen, p.111-116, In German with French summary. 6 refs.
Kuster, P.
Floods, Vegetation factors.

46-18
Natural and artificial retention in the Reuss Valley. [Natürliche und künstliche Retention im Reusstal].
Naef, F., *Bundesamt für Wasserwirtschaft, Bern. Mitteilung*, 1991, No.4, Ursachenanalyse der Hochwasser 1987, Ergebnisse der Untersuchungen, p.117-119, In German with French summary.
Flood control, Water retention.

46-19
Alps in the greenhouse. [Die Alpen im Treibhaus].
Schaub, D., *Wasser, Energie, Luft—Eau, énergie, air*, 1991, 83(3/4), p.71-72, In German. 2 refs.
Global warming, Glacier melting, Switzerland—Alps.

46-20
New timber sills for the river Töss. [Neuartige Holzschwellen für die Töss].
Krebs, P., et al, *Wasser, Energie, Luft—Eau, énergie, air*, 1991, 83(3/4), p.89-95, In German with English and French summaries. 7 refs.
Bieler, F.
Hydraulic structures, Flood control, River flow, Flow control, Bank protection (waterways).

46-21
Tornado type vortices in hydraulic engineering. [Tornadowirbel im Wasserbau].
Hager, W.H., *Wasser, Energie, Luft—Eau, énergie, air*, 1990, 82(11/12), p.325-330, In German with English summary. 4 refs.
Hydraulics, Hydrodynamics, Hydraulic structures, Turbulent flow, Water flow.

46-22
Comparison of the albedo of various surfaces for solar UVB radiation and global radiation. [Vergleich der Albedo verschiedener Oberflächen für solare UVB-Strahlung und Globalstrahlung].
Blumthaler, M., et al, Servizio Meteorologico Italiano, [1988], 6p., In German with English summary. 7 refs. Presented at the 20th International Conference on Alpine Meteorology, Sestola, Italy, Sep. 18-25, 1988. Vol.3.
Ambach, W.
Snow cover effect, Albedo, Solar radiation, Ultraviolet radiation.

46-23
Membrane for in situ optical detection of organic nitro compounds based on fluorescence quenching.
Jian, C., et al, *Analytica chimica acta*, 1990, Vol.237, MP 2933, p.265-271, 10 refs.
Seitz, W.R.
Ground water, Water pollution, Soil pollution, Chemical analysis, Explosives, Detection, Optical properties, Polymers.
Fluorescent membrane formulations for detecting organic nitro compounds by fluorescence quenching were evaluated. The most sensitive membrane is prepared by solvent casting from cyclohexanone to incorporate pyrenebutyric acid into cellulose triacetate plasticized with isodecyl diphenylphosphate. The response follows the Stern-Volmer law for 1,4,6-trinitrotoluene (TNT) and 2,4-dinitrotoluene (DNT). The membrane also responds to hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX). For a given set of conditions, the primary factor determining sensitivity is the extent to which each nitro compound partitions into the membrane. Detection limits are ca. 2 mg/l for DNT and TNT and 10 mg/l for RDX. Nitrogen purging prior to the measurement enhances the sensitivity and eliminates interference from oxygen. The membrane is designed to be used for remote optical in situ screening of groundwater for contamination by explosives.

46-24
Low-pour-point middle distillate fuels from low-sulphur paraffinic oils.
Gasanova, Zh.I., et al, *Chemistry and technology of fuels and oils*, May 1991, 26(9-10), p.515-517, Translated from Khimiia i tekhnologiia topliv i masel, Oct. 1990. 3 refs.
Fuels, Manufacturing, Freezing points, Admixtures, Chemical properties, Chemical analysis, Viscosity.

46-25
Experiments on the transient freezing of water in an inclined rectangular cavity.
Cao, W.Z., et al, *International journal of heat and fluid flow*, June 1991, 12(2), p.116-121, 18 refs.
Poulikakos, D.
Ice formation, Ice water interface, Temperature gradients, Solidification, Phase transformations, Convection, Heat transfer, Buoyancy, Orientation.

46-26
Laboratory studies of the newly discovered infrared band at 4702.1/cm (2.1253 microns) in the spectrum of Io: the tentative identification of CO2.
Sandford, S.A., et al, *Icarus*, May 1991, 91(1), p.125-144, 50 refs.
Extraterrestrial ice, Satellites (natural), Low temperature research, Carbon dioxide, Radiation absorption, Infrared radiation, Aerosols, Ice composition, Spectra.

46-27
Flow of freezing water and aqueous salt solutions through tubes.
Biliushov, V.M., *Journal of engineering physics*, May 1991, 59(5), p.1408-1414, Translated from Inzhenerno-fizicheskiĭ zhurnal, Nov. 1990. 6 refs.
Pipes (tubes), Ice formation, Freezing rate, Salt water, Fluid flow, Pipeline freezing, Salinity, Analysis (mathematics).

46-28
Comprehensive investigation of startup regimes for a frozen heat pipe.
Kanonchik, L.E., et al, *Journal of engineering physics*, May 1991, 59(5), p.1414-1418, Translated from Inzhenerno-fizicheskiĭ zhurnal, Nov. 1990. 10 refs.
Sergeev, P.I.
Heat pipes, Hydrodynamics, Frozen liquids, Thawing, Heat transfer, Slope orientation, Analysis (mathematics).

46-29
Charge separation associated with frost growth.
Rydock, J.P., et al, *Royal Meteorological Society. Quarterly journal B*, Jan. 1991, 117(498), p.409-420, 14 refs.
Williams, E.R.
Ice crystal growth, Precipitation (meteorology), Charge transfer, Frost, Snow pellets, Ice electrical properties, Vapor diffusion, Temperature effects, Simulation, Cloud electrification.

46-30
Simulating giant hailstone structure with a ballistic aggregation model.
Lozowski, E.P., et al, *Royal Meteorological Society. Quarterly journal B*, Jan. 1991, 117(498), p.427-431, 20 refs.
Brett, M., Tait, N., Smy, T.
Hailstone structure, Simulation, Hailstone growth, Artificial hailstones, Cloud physics, Cloud droplets, Ice models, Ice accretion, Microstructure, Bubbles.

46-31
Dielectric behavior of vapor-deposited amorphous solid water and of its crystalline forms.
Johari, G.P., et al, *Journal of chemical physics*, Aug. 15, 1991, 95(4), p.2955-2964, 41 refs.
Hallbrucker, A., Mayer, E.
Amorphous ice, Ice physics, Cubic ice, Low temperature research, Dielectric properties, Molecular structure, Hydrogen bonds, Temperature effects, Phase transformations.

46-32
International Technical Meeting on Snow, Ice and Water in the Alps in a Warming Atmosphere, Zurich, May 11, 1990. [Internationale Fachtagung über Schnee, Eis und Wasser der Alpen in einer wärmeren Atmosphäre].
Vischer, D., ed, *Zurich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen*, 1990, No.108, 135p., In German with English summaries. Refs. passim. For individual papers see 46-33 through 46-39.
Global warming, Glacier melting, Ground thawing, Climatic changes, Switzerland—Alps.

46-33
Climate scenarios based on varying greenhouse effects. [Klimaszenarien auf Grund des veränderten Treibhauseffekts].
Siegenthaler, U., *Zurich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen*, 1990, No.108, Internationale Fachtagung über Schnee, Eis und Wasser der Alpen in einer wärmeren Atmosphäre (International Technical Meeting on Snow, Ice and Water in the Alps in a Warming Atmosphere, Zurich, May 11, 1990). Edited by D. Vischer, p.7-19, In German with English summary. 13 refs.
Global warming, Glacier melting, Climatic changes, Carbon dioxide.

46-34
Energy exchange between the atmosphere and snow and ice. [Energieaustausch Atmosphäre-Schnee und Eis].
Kuhn, M., *Zurich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen*, 1990, No.108, Internationale Fachtagung über Schnee, Eis und Wasser der Alpen in einer wärmeren Atmosphäre (International Technical Meeting on Snow, Ice and Water in the Alps in a Warming Atmosphere, Zurich, May 11, 1990). Edited by D. Vischer, p.21-32, In German with English summary. 7 refs.
Ice air interface, Snow air interface, Glacier heat balance, Glacier mass balance, Climatic changes.

46-35
Snow and avalanches. [Schnee und Lawinen].
Föhn, P., *Zurich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen*, 1990, No.108, Internationale Fachtagung über Schnee, Eis und Wasser der Alpen in einer wärmeren Atmosphäre (International Technical Meeting on Snow, Ice and Water in the Alps in a Warming Atmosphere, Zurich, May 11, 1990). Edited by D. Vischer, p.33-48, In German with English summary. 15 refs.
Snow depth, Avalanches, Global warming.

46-36
Glaciers. [Gletscher].
Patzelt, G., et al, *Zurich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen*, 1990, No.108, Internationale Fachtagung über Schnee, Eis und Wasser der Alpen in einer wärmeren Atmosphäre (International Technical Meeting on Snow, Ice and Water in the Alps in a Warming Atmosphere, Zurich, May 11, 1990). Edited by D. Vischer, p.49-69, In German with English summary. 24 refs.
Aellen, M.
Glacier oscillation, Global warming, Climatic changes.

46-37
Permafrost. [Permafrost].
Haeberli, W., *Zurich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen*, 1990, No.108, Internationale Fachtagung über Schnee, Eis und Wasser der Alpen in einer wärmeren Atmosphäre (International Technical Meeting on Snow, Ice and Water in the Alps in a Warming Atmosphere, Zurich, May 11, 1990). Edited by D. Vischer, p.71-88, In German with English summary. 26 refs.
Global warming, Ground thawing, Permafrost thermal properties, Rock glaciers.

46-38
Periglacial debris flows. [Periglaziale Murgänge].
Zimmermann, M., *Zurich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen*, 1990, No.108, Internationale Fachtagung über Schnee, Eis und Wasser der Alpen in einer wärmeren Atmosphäre (International Technical Meeting on Snow, Ice and Water in the Alps in a Warming Atmosphere, Zurich, May 11, 1990). Edited by D. Vischer, p.89-107, In German with English summary. 30 refs.
Global warming, Periglacial processes, Landslides.

46-39
Runoff. [Abfluss].
Schädler, B., *Zurich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen*, 1990, No.108, Internationale Fachtagung über Schnee, Eis und Wasser der Alpen in einer wärmeren Atmosphäre (International Technical Meeting on Snow, Ice and Water in the Alps in a Warming Atmosphere, Zurich, May 11, 1990). Edited by D. Vischer, p.109-125, In German with English summary. 18 refs.
Runoff, Global warming.

46-40
Prediction of load carrying capacity of deep snow by Rammsonde hardness.
Irwin, G.J., et al, International Conference of the ISTVS, 10th, Kobe, Japan, Aug. 20-24, 1990. Proceedings, Vol.1, Hanover, NH, International Society for Terrain-Vehicle Systems, [1990], p.83-93, 4 refs.
Mohamed, A.M.O., Alammawi, S., Yong, R.N.
Snow strength, Trafficability, Snow hardness, Penetration tests, Snow density, Analysis (mathematics).

46-41
Geographic Snow Information System for vehicle mobility prediction.
Granberg, H.B., et al, International Conference of the ISTVS, 10th, Kobe, Japan, Aug. 20-24, 1990. Proceedings, Vol.1, Hanover, NH, International Society for Terrain-Vehicle Systems, [1990], p.95-106, 3 refs.
Irwin, G.J.
Snow strength, Trafficability, Snow surveys, Computer applications.

46-42
Mechanisms controlling vehicle mobility on a thawing soil.
Shoop, S.A., MP 2934, International Conference of the ISTVS, 10th, Kobe, Japan, Aug. 20-24, 1990. Proceedings, Vol.1, Hanover, NH, International Society for Terrain-Vehicle Systems, [1990], p.301-311, 6 refs.
Ground thawing, Soil trafficability, Traction, Thaw depth.
Vehicle traction and motion resistance were tested on several freeze-thaw conditions of silty sand. Mobility tests were performed using an instrumented vehicle in a large test basin where soil temperature and saturation were controlled. The work aimed to determine how soil parameters influence vehicle mobility the most. When the soil water content is above the liquid limit, motion resistance sharply increases and traction declines rapidly. At these high water contents the thawed soil has little shear resistance, and any traction or motion resistance is provided by the hard frozen layer below. As the thaw depth increases, the vehicle sinks deeper into the soil, increasing the motion resistance. At depth, the strength contributions of the frozen layer become less effective and gross traction decreases. This results in low net traction for deep wet thaws. At low water contents, traction decreases with increasing thaw depth but resistance is constant. At water contents near the liquid limit, the soil strength is at a maximum and the depth of thaw does not significantly influence vehicle mobility.

46-43
Development of a field screening method for RDX soil.
Walsh, M.E., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, June 1991, SR 91-07, 21p., ADA-239 106, 20 refs.
Jenkins, T.F.
Soil pollution, Sampling, Soil chemistry, Explosives, Laboratory techniques, Soil analysis, Chemical analysis, Chemical properties.
CRREL has developed laboratory procedures to detect and quantify nitroaromatic and nitramine explosives in environmental samples. As with all methods used to detect contaminants in the environment, most of the samples analyzed prove to be blank. A more economical approach would be to screen a large number of samples on-site and to use the results to select samples for more in-depth laboratory analysis. TNT (2,4,6-trinitrotoluene) and RDX (hexhydro-1,3,5-trinitro-1,3,5,-triazine) are the two explosives most commonly found in munitions-contaminated soils. Jenkins (1990) developed a field screening method to detect TNT in soil. This report will describe a complementary procedure for detection of RDX.

46-44
Interpretation of passive microwave imagery of surface snow and ice—Harding Lake, Alaska.
Melloh, R.A., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, June 1991, CR 91-11, 30p., ADA-239 140, 24 refs.
Eppler, D.T., Farmer, L.D., Gatto, L.W., Chacho, E.F., Jr.
Lake ice, Ice conditions, Aerial surveys, Imaging, Snow cover effect, Radiometry, Microwaves, Photointerpretation, Surface properties, Correlation, Brightness.
This report presents interpretations of snow and ice conditions on Harding Lake, Alaska, using 33.6-GHz passive microwave imagery acquired from 1500 m on 8 and 11 March 1988, when snow conditions were dry and wet, respectively. Field data used include an aerial video mosaic, ice column descriptions, snow observations and an impulse radar trace. Results show that low-altitude passive microwave imagery is a promising method for remote field investigation of large-scale lake ice processes. Fracture patterns in the lake ice were detected where snow ice had formed above and near cracks in the ice cover. Presumably, bubbles in the snow ice layer scattered less energy than the depth hoar crystals over the adjacent ice surface, resulting in warmer brightness temperatures over the fractures. Brightness temperatures of a continuous and deeper

snowcover at the northwest end of the lake were low compared to the combined radiance of snowdrifts and pockets of bare ice across the lake surface.

46-45

Automotive batteries at low temperatures.

Diemand, D., *U.S. Army Cold Regions Research and Engineering Laboratory. Technical digest*, May 1991, TD 91-04, 23p., ADA-239 115, 12 refs.

Electric equipment, Electric power, Cold weather performance, Low temperature research, Design criteria, Winter maintenance, Motor vehicles.

Twelve-volt lead-acid batteries are almost universally used for electrical storage in automotive and construction vehicles in all areas. However, their performance depends strongly on temperature. This digest deals primarily with the performance of this type of battery at low operating temperatures.

46-46

Duration of the ice season and statistics of fast ice thickness along the Finnish coast, 1961-1990.

Seinä, A., et al, *Finnish marine research*, 1991, No.258, 46p., With Finnish summary. 8 refs.

Peltola, J.

Sea ice distribution, Fast ice, Ice cover thickness, Seasonal variations, Statistical analysis, Coasts, Freezeup, Ice breakup, Baltic Sea.

46-47

Unexpectedly stable clathrate hydrates formed from microporous vapor-deposited amorphous solid water at low "external" guest pressures and their astrophysical implications.

Hallbrucker, A., et al, *Icarus*, Mar. 1991, 90(1), p.176-180, 44 refs.

Mayer, E.

Extraterrestrial ice, Simulation, Clathrates, Hydrates, Ice formation, Vapor pressure, Amorphous ice, Chemical analysis, Porosity, Low temperature research.

46-48

Effect of topology of water-ice mixture on radar backscattering by hailstones.

Chýlek, P., et al, *Journal of applied meteorology*, July 1991, 30(7), p.954-959, 24 refs.

Pinnick, R.G., Srivastava, V.

Radar echoes, Backscattering, Hailstone structure, Ice water interface, Dielectric properties, Spongy ice, Precipitation (meteorology), Surface structure.

46-49

Information content of AVHRR channels 4 and 5 with respect to the effective radius of cirrus cloud particles.

Parol, F., et al, *Journal of applied meteorology*, July 1991, 30(7), p.973-984, 42 refs.

Buriez, J.C., Brogniez, G., Fouquart, Y.

Clouds (meteorology), Scattering, Radiometry, Ice crystal optics, Spaceborne photography, Radiation absorption, Optical properties, Detection, Particles.

46-50

Comparison of ice-phase microphysical parameterization schemes using numerical simulations of tropical convection.

McCumber, M., et al, *Journal of applied meteorology*, July 1991, 30(7), p.985-1004, 61 refs.

Cloud physics, Convection, Precipitation (meteorology), Ice melting, Snow pellets, Ice physics, Computerized simulation, Scattering, Particles.

46-51

Improvements to a commonly used cloud microphysical bulk parameterization.

Potter, B.E., *Journal of applied meteorology*, July 1991, 30(7), p.1040-1042, 11 refs.

Cloud physics, Precipitation (meteorology), Ice melting, Falling snow, Analysis (mathematics), Particle size distribution.

46-52

Comparison of simultaneous airborne and radiometric measurements of supercooled liquid water.

Hill, G.E., *Journal of applied meteorology*, July 1991, 30(7), p.1043-1046, 11 refs.

Atmospheric composition, Water content, Supercooled clouds, Radiometry, Aerial surveys, Correlation, Accuracy, Microwaves.

46-53

Oceanic micronektonic/macrozooplanktonic community structure and feeding in ice covered antarctic waters during the winter (AMERIEZ 1988).

Lancraft, T.M., et al, *Polar biology*, June 1991, 11(3), p.157-167, Refs. p.166-167.

Hopkins, T.L., Torres, J.J., Donnelly, J.

Plankton, Ice cover effect, Sea water, Scotia Sea, Antarctica—Weddell Sea.

Fifty-seven species of oceanic micronekton and macrozooplankton were collected under pack ice during the winter in the vicinity of the Weddell-Scotia Confluence. The majority of the 57 species did not vertically migrate and lived deeper during the winter than during the spring or fall. In the upper 1000 m the dominant species were, in order of decreasing biomass, *Euphausia superba*, the cnidarian *Atolla wyvillei*, the ctenophore *Beroe* sp., and the mesopelagic fish *Electrona antarctica*. *Bathylagus antarcticus* and *Gymnoscopelus braueri*. *Thysanoessa macrura* and *Salpa thompsoni* were biomass subdominants. The majority of the dominant species showed little seasonal differences in biomass. However, the biomass of gelatinous species varied considerably, with *A. wyvillei* and *Beroe* sp. being most abundant and *S. thompsoni* least abundant during the winter. Incidence of food in the stomachs in several important species was low, suggesting a low impact on their zooplankton prey. *Euphausia superba* and the three common mesopelagic fish had significantly lower stomach fullness ratings during the winter than during the fall, suggesting an overall decrease in feeding activity of dominant species during the winter. (Auth. mod.)

46-54

Photoadaptation of sea-ice microalgae in the Barents Sea.

Johnson, G., et al, *Polar biology*, June 1991, 11(3), p.179-184, Refs. p.183-184.

Hegseth, E.N.

Algae, Sea ice, Ice cover effect, Photosynthesis, Barents Sea.

46-55

Short-term variations in particulate matter sedimentation off Kapp Norvegia, Weddell Sea, Antarctica: relation to water mass advection, ice cover, plankton biomass and feeding activity.

Bathmann, U., et al, *Polar biology*, June 1991, 11(3), p.185-195, Refs. p.194-195.

Fischer, G., Müller, P.J., Gerdes, D.

Plankton, Biomass, Chemical analysis, Sea water, Antarctica—Weddell Sea.

A multi-cup sediment trap was deployed at 250 m in the shelf area off Kapp Norvegia, Weddell Sea (630 m water depth) to determine the relative importance of water mass advection, sea ice movement, phytoplankton biomass and plankton feeding. Short-term fluctuations in sedimentation were determined using a sampling frequency of 2.7 days over 54 days during Jan. and Feb. 1988. Three periods of enhanced sedimentation were associated with water mass exchange, settling of diatoms following break-up of ice cover and release of fecal matter by krill feeding on particulate matter derived from phytoplankton and ice algae. An initial sedimentation pulse was mainly due to sinking pelagic diatoms and krill fecal strings containing algae released from sea ice passing over the trap position. The delta C-13 composition of the sedimented organic carbon was about -24 per mill. The isotope ratio decreased sharply by about 5.5 per mill at the end of the first pulse, indicating the source of sinking matter becoming pelagic diatoms of the retreating ice-edge. At this time the diatom *Corethron criophilum* contributed a very high proportion of the organic flux. (Auth. mod.)

46-56

Radar studies of antarctic glacier conditions.

Efimov, V.B., et al, *Soviet journal of remote sensing*, 1990(Pub. 1991), 8(4), p.565-579, Translated from Issledovanie Zemli iz kosmosa, Vol.10, No.4. 12 refs.

Spaceborne photography, Glaciers, Imaging, Airborne radar, Side looking radar, Synthetic aperture radar.

The data of side-scan radar on board the Kosmos-1500 and -1602 satellites for sensing antarctic glaciers are interpreted. A model of microwave scattering by glaciers is developed. Analytic solutions are considered for intense bulk scattering within a half-space with a rough upper boundary. (Auth.)

46-57

West antarctic collapse: how likely.

Alley, R.B., *Episodes*, Dec. 1990, 13(4), p.231-238, Refs. p.237-238.

Low temperature research, Ice sheets, Ice physics, Climatic factors, Ice deterioration, Antarctica—West Antarctica.

Studies in West Antarctica show that some of its ice streams move very rapidly, apparently because of significant basal lubrication. The high ice-stream velocities result in local thinning of ice that might expand and bring about the collapse of the ice sheet. Another possibility is that a global greenhouse effect could warm the ocean waters circulating beneath the ice shelves and melt the ice at its base, even without melting the top surface of the ice. This could lead to the catastrophic collapse of the West Antarctic marine ice sheet and possibly parts of the East Antarctic and Greenland ice sheets as well. (Auth. mod.)

46-58

Actinomycete from very ancient layers of the icesheet of central Antarctica.

Abyzov, S.S., et al, *Microbiology*, Nov.-Dec. 1990 (Pub. May 1991), 59(6), p.768-773, Translated from Mikrobiologiia. 20 refs.

Biriuzova, V.I., Kostrikina, N.A.

Microbiology, Ice cores, Cryobiology.

As a result of microbiological analyses of an ice core extracted from different layers of the icesheet of central Antarctica, a small content of microorganisms was found belonging to various taxonomic groups. From a layer of the icesheet with an age of about 47,000 years one strain of actinomycete was isolated, which was close to the species *Streptomyces calvus*. Prolonged existence in a state of deep anabiosis at constant low temperatures of the order of -55 C had practically no effect on the main cultural and cytological characters of the streptomycete. (Auth.)

46-59

Airborne bathymetry in ice covered waters.

Walker, P., et al, Meeting and Technical Exhibition, 53rd, Florence, Italy, May 26-30, 1991. Technical programme and abstracts of papers, Zeist, Netherlands, European Association of Exploration Geophysicists, 1991, p.396-397.

Holladay, S.

Sounding, Electromagnetic prospecting, Subglacial observations, Aerial surveys, Sea ice.

46-60

Geocryological studies. [Geokriologicheskie issledovaniia].

Ershov, E.D., ed, Moscow, Universitet, 1989, 248p., In Russian. Refs. passim. For individual papers see 46-61 through 46-88.

Geocryology, Hydrogeology, Saline soils, Frozen rocks, Permafrost, Mathematical models, Analysis (mathematics).

46-61

Evolution of permafrost strata in the history of the Earth. [Evoliutsiia tolshch merzlykh porod v istorii Zemli].

Ershov, E.D., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.3-16, In Russian. 6 refs.

Permafrost origin, Permafrost distribution, Paleoclimatology.

46-62

Stratified ice and subaqueous cryolithogensis. [Plastovye l'dy i subakval'nyi kriolitogenez].

Danilov, I.D., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.16-29, In Russian. 13 refs.

Subsea permafrost, Ice structure, Lithology, Geocryology, Ground ice, Ice composition.

46-63

Basic types of salinization of frozen rocks and their distribution. [Osnovnye tipy zasoleniia merzlykh gornykh porod i ikh rasprostraneniej].

Dubikov, G.I., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.29-39, In Russian. 8 refs.

Ivanova, N.V.

Frozen rocks, Saline soils, Distribution.

46-64

Maximum depth of ice segregation in the epigenetic formation of permafrost. [O predel'noi glubine shlirovogo l'dovydeleniia pri epigeneticheskom formirovanii mnogoletnemerzlykh porod].

Ershov, E.D., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.39-49, In Russian. 16 refs.

Lebedenko, IU.P., Kondakov, V.V.

Moisture transfer, Permafrost structure, Frozen rocks, Soil water migration, Geocryology, Analysis (mathematics).

46-65

Problems of water formation in the cryolithozone. [Problemy gidratoobrazovaniia v kriolitozone].

Ershov, E.D., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.50-63, In Russian. 30 refs.

Hydrates, Permafrost hydrology, Geocryology, Analysis (mathematics).

46-66

Transfer of dissociated salts in frozen ground under the effect of a temperature gradient. [Perenos dissotsiirovannykh solei v merzlykh gruntakh pod vliianiem gradienta temperatury].

Ostroumov, V.E., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.63-74, In Russian. 25 refs.

Saline soils, Frozen ground thermodynamics, Geocryology, Soil water migration, Temperature gradients, Ion diffusion, Analysis (mathematics).

46-67

Role of radiation factors in forming the temperature regime of soils. [Rol' radiatsionnykh faktorov v formirovanii temperaturnogo rezhima gruntov].

Bryksin, V.N., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.75-83, In Russian. 13 refs.

Thermal regime, Surface temperature, Soil temperature, Geocryology, Radiation, Analysis (mathematics).

46-68
Study of space-time variability in geocryological conditions based on combinations of typological regionalization and mathematical modeling. [Issledovanie prostranstvenno-vremennoĭ izmenchivosti geokriologicheskikh uslovīĭ na osnove kombinatsii tipologicheskogo raĭonirovaniia i matematicheskogo modelirovaniia].
Garagulia, L.S., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.83-90, In Russian. 11 refs.
Geocryology, Mathematical models, Time factor.

46-69
Paleofacial conditions for the formation and growth of an "ice complex" of deposits in the Far North of Western Siberia. [Paleofatsial'nye obstanovki formirovaniia i vozrast "ledovogo kompleksa" otlozheniĭ na Krainem Severe Zapadnoĭ Sibiri].
Danilov, I.D., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.90-98, In Russian. 16 refs.
Poliakova, E.I.
Geocryology, Ground ice, Ice wedges.

46-70
Three-dimensional variability in the thickness of the cryolithozone in Central Siberia. [Prostranstvennaia izmenchivost' moshchnosti kriolitozony Sredneĭ Sibiri].
Kondrat'eva, K.A., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.99-107, In Russian. 3 refs.
Khrutskiĭ, S.F.
Geocryology, Variations, Permafrost thickness.

46-71
New approach to and evaluation of the stability of landscapes in the North, broken up by the action of cryogenic processes. [O novom podkhode i otsenke ustoichivosti landshaftov Severa razrushitel'nomu vozdeĭstviiu kriogennykh protsessov].
Maksimova, L.N., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.108-112, In Russian. 16 refs.
Leonov, N.G., Bugaeva, E.V.
Geocryology, Landscape types, Stability.

46-72
Comparative evaluation of average annual temperature of rocks in the northeast and European parts of the USSR. [Sravnitel'naia otsenka srednegodovykh temperatur porod Severo-Vostoka i Evropeĭskoĭ chasti SSSR].
Zamolotchikova, S.A., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.113-117, In Russian. 11 refs.
Frozen rock temperature, Geocryology, Heat balance.

46-73
Geocryological classification of paludal massifs in Southern Yakutia. [Geokriologicheskaia klassifikatsiia bolotnykh massivov IUzhnoĭ IAkutii].
Ospennikov, E.N., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.117-124, In Russian. 12 refs.
Peat, Geocryology, Loams, Soil classification, Sands, Cryogenic structures, Permafrost.

46-74
Evaluation of allowable technical operations in the cryolithozone (in the example of the central part of the BAM development zone). [Otsenka dopustimosti tekhnogennykh vozdeĭstviĭ v kriolitozone (na primere tsentral'nogo uchastka zony osvoeniia BAM)].
Lisitsyna, O.M., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.124-133, In Russian. 7 refs.
Geocryology, Permafrost preservation, Environmental impact, Environmental protection.

46-75
Cryogenic transformation of a hydrogeological cross section, and regularities governing the formation of ground water in the Sikhote-Alin region. [Kriogennoe preobrazovanie gidrogeologicheskogo razreza i zakonomernosti formirovaniia podzemnykh vod Sikhote-Alinskogo regiona].
Afanasenko, V.E., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.134-144, In Russian.
Kurinova, T.A.
Geocryology, Ground water, Hydrogeology, USSR—Sikhote-Alin.

46-76
Characteristics of filtration in rocks with increased fracturing in the cryolithozone (in the example of the Udokan Range). [Osobennosti fil'tratsii v porodakh povyshennoĭ treschinovatosti kriolitozony (na primere khrebta Udokan)].
Sergeev, D.O., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.144-149, In Russian. 7 refs.
Klimov, I.V., Volkova, V.P., Roshchupkina, N.A.
Geocryology, Seepage, Rock mechanics.

46-77
Features of rain slope runoff in permafrost areas. [Osobennosti dozhdevogo sklonovogo stoka v oblasti rasprostraneniia mnogoletnemerzlykh porod].
IAvelov, A.V., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.149-157, In Russian. 8 refs.
Runoff, Rain, Geocryology, Slope processes.

46-78
Changes in permafrost and hydrogeological conditions during technical operations (in the example of the Noril'sk region). [Izmenenie merzlotnykh i gidrogeologicheskikh uslovīĭ pri tekhnogennom vozdeĭstvii (na primere Noril'skogo raĭona)].
Kadkina, E.A., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.157-162, In Russian.
Derevianko, N.A., IAkovlev, A.O.
Geocryology, Permafrost hydrology, Hydrogeology, Subpermafrost ground water, Suprapermafrost ground water.

46-79
Some problems in experimental studies of geocryology. [O nekotorykh zadachakh eksperimental'nykh issledovaniĭ v geokriologii].
Lebedenko, IU.P., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.163-171, In Russian. 51 refs.
Geocryology, Research projects.

46-80
Nature of the thermal deformation anomalies of frozen ground. [Priroda anomal'nykh temperaturnykh deformatsiĭ merzlykh gruntov].
Ershov, E.D., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.171-183, In Russian. 5 refs.
Deformation, Temperature effects, Frozen ground thermodynamics, Geocryology, Frozen ground physics, Frozen ground temperature.

46-81
Evaluating the possibility of using the time analogy method for forecasting the deformability of frozen saline soils. [Otsenka vozmozhnosti primeneniia metoda vremennykh analogiĭ dlia prognoza deformiruemosti merzlykh zasolennykh gruntov].
Roman, L.T., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.183-194, In Russian. 9 refs.
Kuleshov, IU.V.
Geocryology, Soil freezing, Saline soils, Frozen ground mechanics, Deformation, Forecasting, Analysis (mathematics).

46-82
Method of evaluating the deformation of the frost heave of ground through its swelling. [Metod otsenki deformatsiĭ moroznogo pucheniia gruntov cherez ikh nabukhanie].
Orlov, V.O., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.195-201, In Russian. 14 refs.
Filippov, V.D.
Frost heave, Geocryology, Deformation.

46-83
Deformation of frozen rocks from interaction with aqueous salt solutions. [Deformirovanie merzlykh porod pri vzaimodeĭstvii s vodnymi rastvorami soleĭ].
Ershov, E.D., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.202-217, In Russian. 6 refs.
Lebedenko, IU.P., Chuvilin, E.M., Panchenko, V.I.
Geocryology, Frost heave, Deformation, Frozen rocks, Saline soils, Analysis (mathematics).

46-84
Possibility of a breakdown of minerals in the cryolithozone with the help of microorganisms. [K voprosu o vozmozhnosti razrusheniia mineralov v kriolitozone pri uchasti mikroorganizmov].
Kol'chugina, T.P., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.217-220, In Russian. 4 refs.
Fedosova, S.P., IUkina, M.P.
Geocryology, Minerals, Microbiology.

46-85
Microbiological approach to the study of the development of frozen layers. [Mikrobiologicheskiĭ podkhod k izucheniiu razvitiia merzlykh tolshch].
Gilichinskiĭ, D.A., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.221-232, In Russian. 18 refs.
Microbiology, Geocryology, Cryogenic soils, Cryogenic structures, Permafrost.

46-86
Methods and procedures of regional geocryological studies. [O metodakh i metodikakh regional'nykh geokriologicheskikh issledovaniĭ].
Garagulia, L.S., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.232-237, In Russian.
Geocryology, Research projects.

46-87
Calculating a temperature shift based on two-layered seasonal freeze thaw layers. [Raschet temperaturnoĭ sdvizhki s uchetom dvukhsloĭnogo stroeniia sloia sezonnogo promerzaniia (protaivaniia)].
Romanovskiĭ, V.E., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.237-243, In Russian. 6 refs.
Volokhov, S.S., Kamornyĭ, V.IU.
Geocryology, Active layer, Freeze thaw cycles, Seasonal freeze thaw, Temperature variations, Analysis (mathematics).

46-88
Some mathematical models of geocryological problems and methods for their numerical solution. [Nekotorye matematicheskie modeli zadach geokriologii i metody ikh chislennogo resheniia].
Seregina, N.V., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1989, p.243-246, In Russian. 10 refs.
Geocryology, Mathematical models, Stefan problem.

46-89
Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988.
Birenzvige, A., ed, *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, MP 2935, 298p., Refs. passim. For selected papers see 46-90 through 46-105.
Yurow, H.W., ed, Parker, L.V., ed.
Military operation, Cold weather operation, Pollution, Chemical properties, Waste treatment, Countermeasures, Impurities, Explosives.
The first tri-service workshop on chemical operations in cold weather was held on Aug. 16-17, 1988. The meeting was attended by representatives of different military R&D organizations, the user community, the intelligence community, and the medical community. Papers presented covered the whole gamut of the chemical cold battlefield including problems associated with detection of CB agents, protection (individual and collective) against contamination, and casualty treatment.

46-90
Overview of Cold Regions Research and Engineering Laboratory (CRREL).
Link, L.E., Jr., *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, MP 2936, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.13-14.
Research projects, Military research, Organizations, Laboratories.

46-91
Soviet cold weather chemical warfare threat offense and defense.
Byrnes, J.C., *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.15-19.
Military operation, Cold weather operation, Explosives, Chemical properties, Poliution, USSR.

46-92
Novel dissemination and threat agents.
Yurow, H.W., *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.21-29
Military operation, Cold weather operation, Aerosols, Air pollution, Chemical properties, Physiological effects, Ice fog.

46-93
Effectiveness of chemical munitions in cold weather.
Montgomery, J.R., *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.31-41.
Military operation, Cold weather operation, Explosives, Air pollution, Chemical properties.

46-94
Chemical agent persistence in cold weather.
Leggett, D.C., *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, MP 2937, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.43-60, 10 refs.
Military operation, Cold weather operation, Pollution, Impurities, Solubility, Environmental impact, Decomposition, Evaporation, Chemical properties.
Knowledge of chemical agent persistence is necessary for adequate protection of personnel. Persistence is significantly affected both by low temperature and by physical/chemical interaction with snow or ice. Evaporation and hydrolysis appear to be the major decay mechanisms. Factors affecting evaporation can be divided into two categories, those that are independent of the substrate surface and those that depend on the type of surface. In the absence of surface effects, simple mathematical models such as the one developed by Chinn can be used to predict persistence. In case of ice and snow, however, theoretical considerations suggest that an agent evaporation model should at least take into account ice solubility in the agent. The presence of snow/ice also provides the potential for hydrolytic decomposition of the agents. Experimental work with the simulant DFP suggests that about a 2.5-fold decrease in hydrolysis rate occurs per 10 C decrease in temperature below 0 C. A total weathering model for chemical agents was derived using the data on DMMP evaporation and DFP hydrolysis.

46-95
Chemical defense in the arctic environment.
Thorsby, E., *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.67-75.
Military operation, Cold weather operation, Pollution, Impurities, Countermeasures, Physiological effects, Chemical properties.

46-96
Simulants for cold weather testing.
White, W.E., et al, *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.93-98.
Stuempfle, A.K.
Military operation, Cold weather tests, Pollution, Simulation, Chemical properties.

46-97
Overview of smoke and obscuration in the winter.
Green, J., et al, *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, MP 2951, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.99-109, 7 refs.
Erickson, M., Redfield, R.
Military operation, Cold weather operation, Air pollution, Smoke generators, Snow optics, Visibility, Atmospheric attenuation.

46-98
Snow-smoke and snow-vapor interaction.
Hogan, A.W., *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, MP 2938, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.111-115, 3 refs.
Falling snow, Air pollution, Scavenging, Military operation, Snowflakes, Snow air interface.

46-99
Cold weather considerations for automatic chemical agent point detectors.
Edler, S.C., *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.117-119.
Air pollution, Warning systems, Military equipment, Detection, Cold weather operation.

46-100
Operation of electronic equipment in winter conditions.
Atkins, R.T., *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, MP 2939, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.121-128, 5 refs.
Cold weather operation, Electronic equipment, Military equipment.

46-101
Decontamination of chemical agents on a winter battlefield—an overview.
Parker, L.V., *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, MP 2940, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.173-184, 22 refs.
Cold weather operation, Military operation, Pollution, Waste treatment, Countermeasures, Chemical properties, Environmental protection.

46-102
Temperature effects on aqueous decontamination.
Kanaris, L., *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.185-194, 5 refs.
Cold weather operation, Military operation, Pollution, Waste treatment, Countermeasures, Chemical properties, Environmental protection.

46-103
Surface temperature: the critical parameter in decontamination by forced hot air and other surface-heating methods.
Carlon, H.R., *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.199-223.
Cold weather operation, Military operation, Pollution, Waste treatment, Evaporation.

46-104
Surface evaporation: effect of substrate material and temperature.
Lunardini, V.J., *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, MP 2941, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.225-237, 18 refs.
Cold weather operation, Military operation, Pollution, Evaporation, Waste treatment, Analysis (mathematics), Chemical properties.
The decontamination of surfaces covered by chemical agents can be greatly accelerated by the use of a heated air stream impinging upon the surface. The actual rate of evaporation for any agent, is a function of the thermal history of the agent. Thus, it was expected that the nature of the substrate upon which the agent is deposited could be significant. A preliminary estimate of the effect of cold climates on the process was carried out using a simple physical model of the evaporation. A thin layer of liquid and a semi-infinite substrate are initially at a constant temperature and are subjected to a convective heat transfer flux from the ambient air also at a fixed temperature. The surface temperature of the liquid will increase until it reaches the normal boiling point. For simplicity, it is assumed that no evaporation takes place during this time. The liquid film then evaporates while its surface temperature remains at the boiling point. The analysis indicated that the substrate material and temperature will have a significant effect on the evaporation time. If the substrate is a good conductor, such as steel or aluminum, the evaporation time will greatly exceed the time needed to evaporate the same thickness from a semi-infinite layer of the substance. Also, an initial temperature of 10 F will require a significantly longer evaporation time than that for a temperature of 70 F. Predictions have been made for various thicknesses of water and HD on steel or bakelite surfaces.

46-105
Temperature effects on interactions between polymeric materials and water or simulants: implications for chemical operations in cold weather.
Illinger, J.L., et al, *U.S. Army Chemical Research, Development and Engineering Center. Special publication,* Jan. 1990, CRDEC-SP-019, Tri-Service Workshop on Chemical Operations in Cold Weather, Aug. 1988. Edited by A. Birenzvige, H.W. Yurow, and L.V. Parker, p.245-261.
Wilde, A.F.
Cold weather operation, Military operation, Pollution, Polymers, Chemical properties.

46-106
Implications of CO2 global warming on Great Lakes ice cover.
Assel, R.A., *Climatic change,* June 1991, 18(4), p.377-395, 24 refs.
Lake ice, Ice cover thickness, Ice melting, Ice forecasting, Global warming, Climatic changes, Carbon dioxide, Statistical analysis, Mathematical models, United States—Superior, Lake.

46-107
Pollen analysis of soils from two locations in the subalpine zone in the Hakkoda Mountains.
Miura, O., *Ecological review,* Mar. 1990, 22(1), p.49-60, 14 refs.
Soil analysis, Mountain soils, Palynology, Vegetation patterns, Pollen, Soil profiles, Swamps, Japan.

46-108
Analysis of frost shields using the finite element method.
Coutermarsh, B.A., et al, MP 2944, International Conference on Numerical Methods in Thermal Problems, 7th, Stanford, CA, July 8-12, 1991. Proceedings, Vol.7, Pt.1. Edited by R.W. Lewis et al, Swansea, UK, Pineridge Press, 1991, p.123-132, 13 refs.
Phetteplace, G.E.
Soil freezing, Frost protection, Underground pipelines, Covering, Design, Heat transfer, Mathematical models, Computerized simulation, Water temperature.
In this paper, a finite element (FE) program has been developed to solve two-dimensional heat transfer problems with phase change. This program has been used to assess the practicality of frost shielding techniques. The term "frost shielding" describes the practice of using rigid board insulation to protect buried water or sewer pipes within the frost zone from freezing. This allows the burial depth to be reduced, resulting in lower installation and maintenance costs.

46-109
Development of field screening methods for TNT and RDX in soil and ground water.
Jenkins, T.F., et al, MP 2943, International Symposium on Field Screening Methods for Hazardous Wastes and Toxic Chemicals, 2nd, Feb. 12-14, 1991, U.S. Environmental Protection Agency, 1991, p.683-686, 6 refs.
Walsh, M.E., Stutz, M.H., Lang, K.T.
Soil pollution, Explosives, Ground water, Water pollution, Soil analysis, Laboratory techniques, Sampling, Chemical analysis.
One of the most serious environmental problems facing the Army is the presence of soil contaminated with residues of high explosives at sites where the munitions were formerly manufactured, stored, used or demilitarized. TNT and RDX are the two residues most commonly encountered because these explosives were extensively produced and do not rapidly decompose. Since TNT and RDX leach through the unsaturated zone with downward percolating water, they pose an immediate problem to ground water; thus contaminated soil must be treated or isolated. Although laboratory methods for analyzing munitions residues in soil and water are now available, reliable field methods are also desirable so that zones of high contamination can be located during initial surveys and the interface between clean soil and contaminated soil identified during cleanup. In this paper, the development of such a field method is described

46-110
Multiple Wisconsinan glacigenic sequences at Wedron, Illinois.
Johnson, W.H., et al. *Journal of sedimentary petrology*, Jan. 1990, 60(1), MP 2942, p.26-41, 56 refs.
Hansel, A.K.
Lithology, Glacial deposits, Sediment transport, Stratigraphy, Glacier oscillation, Subglacial observations, Moraines.

46-111
Engineering and design. Winter navigation on inland waterways.
U.S. Army Corps of Engineers. *Engineer manual*, Dec. 31, 1990, 1110-8-1(FR), 120p. + appends., 41 refs.
Rivers, Ice control, River ice, Ice navigation, Ice forecasting, Countermeasures, Cold weather operation, Ice jams, Hydraulic structures, Ice cover effect, Engineering, Channels (waterways)

46-112
Seasonal variations in the concentration of Be-10, chloride, nitrate and sulphate ions, H2O2, Pb-210, H-3, mineral dust and (delta)O-18 in Greenland snow.
Beer, J., et al. *Atmospheric environment*, 1990, 25A(5-6), p.899-904, 26 refs.
Snow composition, Snow impurities, Isotope analysis, Seasonal variations, Air pollution, Atmospheric composition, Scavenging, Chemical analysis, Sampling, Greenland.

46-113
Spatial and temporal variability of rime ice and snow chemistry at five sites in California
Berg, N., et al. *Atmospheric environment*, 1990, 25A(5-6), p.915-926, 24 refs.
Dunn, P., Fenn, M.
Hoarfrost, Snow cover, Distribution, Chemical composition, Ion density (concentration), Precipitation (meteorology), Sampling, Cloud droplets, Mountains.

46-114
Yukon Territory snow survey bulletin and water supply forecast, May 1, 1991.
Canada. Indian and Northern Affairs. Water Resources Division, Whitehorse, 1991, 26p.
Snow surveys, Snow water equivalent, Runoff forecasting, Canada—Yukon Territory.

46-115
Yukon Territory snow survey bulletin and water supply forecast, May 15, 1991.
Canada. Indian and Northern Affairs. Water Resources Division, Whitehorse, 1991, 26p.
Snow surveys, Snow water equivalent, Runoff forecasting, Canada—Yukon Territory.

46-116
Recent observations of air temperature and snow depth in the Mackenzie Valley area and their implications on the stability of permafrost layers.
Stuart, R.A., et al. *Canadian Climate Centre. Report*, Apr. 1990(Pub. 1991), No.91-02, 178p., With French summary.
Etkin, D.A., Judge, A.S.
Air temperature, Snow depth, Permafrost forecasting, Global warming, Permafrost distribution, Freezing indexes, Canada—Northwest Territories—Mackenzie River.

46-117
Resistance and propulsive performance trials of the M.V. *Terry Fox* and M.V. *Ikaluk* in level ice.
Cowper, D.N.B., et al. *Transport Canada. Report*, Feb. 1991, TP 10845E, 195p. + append., With French summary. Refs. p.188-195.
Comfort, G., Glen, I.F., Ritch, R.
Icebreakers, Metal ice friction, Propellers, Ice loads, Ice navigation, Engines, Mechanical tests.

46-118
Design and testing of impressed current cathodic protection anodes for use on icebreaker hulls.
Peters, D.P.G., *Transport Canada. Report*, May 1991, TP 10797E, 47p. + appends., With French summary.
Icebreakers, Corrosion, Electric equipment, Electrical properties, Countermeasures.

46-119
Design, development and testing of the Arktos passive amphibious barge system. Final report.
Mann, W.R., *Transport Canada*, Dec. 1990, TP 10744E, 13p. + appends., With French summary.
Amphibious vehicles, Cargo, Ships, Logistics, Ice navigation, Transportation.

46-120
Runoff characteristics of sagebrush rangelands: modeling implications.
Wilcox, B.P., et al. *Journal of soil and water conservation*, Mar.-Apr. 1991, 46(2), p.153-158, 17 refs.
Seyfried, M.S., Cooley, K.R., Hanson, C.L.
Plains, Watersheds, Runoff forecasting, Snowmelt, Precipitation (meteorology), Hydrology, Seasonal variations.

46-121
Earth's ice hangs in the balance.
Charles, D., *New scientist*, June 8, 1991, 130(1772), p.22.
Ice sheets, Ice cover effect, Ice melting, Climatic changes.
This note describes a proposed experiment to measure variations in the earth's ice cover by using remote signals from quasars or artificial satellites to detect tiny movements in the ground surface at the ice sheet edge. These movements would result from alterations in the mass balance of the ice sheet due to climatic changes, and are thought to be more easily perceptible in Antarctica and Greenland due to the extreme weight of these ice masses.

46-122
Effect of snow cover on the climate.
Cohen, J., et al. *Journal of climate*, July 1991, 4(7), p.689-706, 28 refs. For another version see 43-4114.
Rind, D.
Snow cover effect, Air temperature, Surface temperature, Climatic factors, Heat balance, Cooling, Temperature variations, Albedo, Mathematical models.

46-123
Wintering conditions and cold-resistance of the amphipod *Traskorchestia ditmari* on the coast of the Sea of Okhotsk.
Berman, D.I., et al. *Soviet journal of marine biology*, July 1991, 16(5), p.267-271, Translated from Biologiia moria, 1990, No.5. 12 refs.
Alfimov, A.V., Leirikh, A.N.
Marine biology, Animals, Cold tolerance, Littoral zone, Soil analysis, Supercooling, Snow cover effect.

46-124
Development of a micromodel of winter road conditions—planning project. [Utveckling av vintervägtjälgsmodell pa mikroniva—planprojekt],
Möller, S., *Sweden. Statens väg-och trafikinstitut. VTI meddelande*, 1990, 649, 31p. + appends., In Swedish with English summary. 7 refs.
Road maintenance, Winter maintenance, Highway planning, Road icing, Models, Ice prevention, Ice removal.

46-125
Results on geological mapping in the nunataks area south of the Schirmacher Oasis, East Antarctica.
Wetzel, H.U., et al. *Zeitschrift für geologische Wissenschaften*, 1991, 19(2), p.145-152, With German summary. 9 refs.
Stackebrandt, W., Hahne, K.
Mapping, Geologic structures, Nunataks, Tectonics, Antarctica—Schirmacher Hills.
This investigation is mainly based on field work by GDR geologists during two field seasons in the years 1985/86, 1986/87 and on that of former Soviet expeditions. The rock unit of the nunataks region subdivided into 2 Proterozoic metamorphic complexes of polymetamorphic granulite and amphibolite facies rocks. The nunataks form the southern continuation of sequence A-G of the Schirmacher Oasis Metamorphic Complex (SOMC). The southwestern nunataks represent the Nunataks Metamorphic Complex (NMC). This complex was overthrust over the SOMC in the north. The NMC includes exposures of about 2,200 m metamorphic rocks which differ from those of SOMC by a slightly higher content of carbonates, stronger metamorphism, wide-spread occurrence of sillimanite-bearing metamorphics and reduced influence of migmatization processes. Like the succession of sequences of the SOMC, the succession of NMC sequences 1-7 does not represent the primary arrangement because of the various stages of tectonic stacking which can be deduced from the tectonic fault pattern. Further investigation of the metamorphic and tectonic development of the nunataks region will provide regional comparison with the Schirmacher area and Queen Maud Land within the framework of the planned GEOMAUD project. (Auth. mod.)

46-126
Contribution to the weathering-controlled removal of chemical elements from the active debris layer of the Schirmacher Oasis, East Antarctica.
Balke, J., et al. *Zeitschrift für geologische Wissenschaften*, 1991, 19(2), p.153-158, With German summary. 8 refs.
Haendel, D., Krüger, W.
Soil chemistry, Weathering, Soil formation, Antarctica—Schirmacher Hills.
Temperature measurements of solid bedrock and loose material, measurements of soil humidity and chemical analyses of soil waters and standing waters show that a release and migration of material take place in the periglacial thawing layer during the south polar summer. A precondition of such a transport process is chemical weathering. Up to now the opinion has still predominated that there is no chemical weathering in the Antarctic. The authors' investigations elucidate definite conditions for chemical weathering. It takes place only in the polar summer and its rate is essentially lower in polar regions than in temperate latitudes. The investigations enlarge the knowledge of physical and chemical weathering in the Antarctic and give some indication of the initial processes of pedogenesis (soil formation). (Auth.)

46-127
Sedimentological tectonical results on sedimentary rocks outcropping at the southern flank of the Shackleton Range, Antarctica.
Paech, H.J., et al. *Zeitschrift für geologische Wissenschaften*, 1991, 19(2), p.159-167, With German summary. 20 refs.
Hahne, K., Maass, I.
Soil chemistry, Sediments, Tectonics, Antarctica—Shackleton Range.
Sediments outcropping in the southern Shackleton Range are characterized. Its lowermost member is built up of debris rich in weathering material which is depleted in Zn, Co, Mn, Cu, Ba and enriched in Al2O3 and oxidized ferrous compounds. The basal quartzite is assumed to be an aeolianite transported from a southern direction. The overlying carbonate-bearing clastics and the arenite-pelite alternation arising from them reflect a shallow marine environment deepening during the accumulation, but not attaining deep water conditions because features indicating turbidites are missing. In palaeogeographic respect the sources area of the sediments is assumed to be located in the east or northeast. Concerning the tectonic structure of the sediments a slightly modified interpretation of the present authors is outlined. In accepting a more intense thrust tectonism caused by rigid scales of the Shackleton Range Crystalline Complex, *the long-distance tectonic transport is denied*. Recently obtained carbon isotope data ranging from *delta*C-13-20 to -27.3 per mill are explained by tectonically controlled maturation. (Auth.)

46-128
Carbon isotope geothermometry of graphite-bearing marbles from central Dronning Maud Land, East Antarctica.
Wand, U., et al. *Zeitschrift für geologische Wissenschaften*, 1991, 19(2), p.169-175, With German summary. 25 refs.
Mühle, K.
Carbon isotopes, Geochemistry, Geothermometry, Heat flux, Antarctica—Queen Maud Land.
In order to estimate the peak metamorphic temperatures in high-grade regional metamorphic marbles from central Queen Maud Land, C-13/C-12 isotope ratios have been measured for coexisting carbonate-graphite pairs. The *delta*C-13 values of carbonates and graphite vary from -0.1 to +4.6 per mill (PDB) and from -3.3 to +1.7 per mill, respectively. The isotopic fractionation between carbonate and graphite ranges from 2.9 to 4.0 per mill and is similar to the *delta*C-13 values observed in other east antarctic and non-antarctic granulite-facies marbles. The metamorphic temperatures calculated are predominantly in the range of 700-800 C. They agree well with metamorphic temperatures derived from mineral chemical studies of metamorphic rocks from this east antarctic region. (Auth. mod.)

46-129
Preliminary geochemical study of microcrystalline quartz varieties occurring in volcanic rocks from King George Island, South Shetland Islands, West Antarctica.
Blankenburg, H.J., et al. *Zeitschrift für geologische Wissenschaften*, 1991, 19(2), p.177-184, With German summary. 36 refs.
Wand, U.
Rock properties, Microstructure, Geochemistry, Antarctica—King George Island.
Microcrystalline SiO2 varieties (agate, chalcedony, jasper) occurring in basic to intermediate, subduction-related volcanic rocks from King George I. have been analyzed for their trace element contents to test a model for agates as "refused" chert xenoliths. In principle, the geochemical features of the samples studied do not contradict such a hypothesis. However, the geochemical data are also consistent with a metasomatic-hydrothermal process. (Auth.)

46-130
Interpretation of snow-climate feedback as produced by 17 general circulation models.
Cess, R.D., et al. *Science*, Aug. 23, 1991, 253(5022), p.888-892, 6 refs.
Models, Climatic changes, Snow cover, Clouds (meteorology).

46-131
Biennial report, 1989-1990.
Colorado. University. Institute of Arctic and Alpine Research, Boulder, [1991], 44p., 100 refs.
Research projects, Organizations, Laboratories, Education.

46-132
Prospects and concerns for satellite remote sensing of snow and ice.
National Research Council. Polar Research Board, Washington, D.C., National Academy Press, 1989, 44p., 14 refs.
Remote sensing, Snow surveys, Glacier surveys, Spaceborne photography.

46-133
Teamwork in the Arctic. *Mining and construction*, 1991, No.1, p.20-22.
Gold, Mining, Site accessibility, Logistics, Canada--Northwest Territories.

46-134
Root systems of plants in frozen soils of Yakutia. [Kornevaia sistema rastenii v merzlotnykh pochvakh IAkutii],
Dokhunaev, V.N., Yakutsk, IAF SO AN SSSR, 1988, 173p., In Russian. Refs. p.162-173.
Roots, Grasses, Trees (plants), Plants (botany), Cryogenic soils, Saline soils.

46-135
On the role of phoresis in cloud ice initiation.
Baker, B.A., *Journal of the atmospheric sciences*, July 1, 1991, 48(13), p.1545-1548, 10 refs.
Cloud physics, Ice formation, Heterogeneous nucleation, Ice nuclei, Scavenging, Aerosols, Clouds (meteorology), Temperature gradients, Vapor pressure.

46-136
Comments on "Physics of supercooling of thin water skins covering gyrating hailstones".
Lozowski, E.P., et al, *Journal of the atmospheric sciences*, July 1, 1991, 48(13), p.1606-1610, For article under discussion see 45-1804. 11 refs.
List, R.
Hailstone growth, Supercooling, Ice physics, Water films, Surface temperature, Thickness, Heat transfer, Analysis (mathematics).

46-137
Automatic noncontact measurement technique for investigation of the effect of frosting on wind convector heat transfer performance.
Monaghan, P.F., et al, *Experimental thermal and fluid science*, July 1991, 4(4), p.399-405, 14 refs.
Ice formation, Ice cover thickness, Measurement, Thermal analysis, Hoarfrost, Pipes (tubes), Heat transfer, Convection, Heating, Image processing, Computer applications, Performance.

46-138
Frost growth and heat transfer for a row of vertical cylindrical tubes located outdoors—general trends.
Monaghan, P.F., et al, *Experimental thermal and fluid science*, July 1991, 4(4), p.406-417, 21 refs. For another version see 44-1375.
Grealish, F., Oosthuizen, P.H.
Pipes (tubes), Thermal analysis, Heat transfer, Hoarfrost, Ice formation, Ice cover thickness, Convection, Wind factors, Frost forecasting, Cold weather tests.

46-139
Development of a new heat collector from air without frost problems.
Takeuchi, H., et al, *Experimental thermal and fluid science*, July 1991, 4(4), p.441-447, 12 refs.
Sato, K., Sato, S., Aoki, H.
Evaporation control, Thermal analysis, Heat recovery, Heat transfer, Particles, Ice formation, Hoarfrost, Ice prevention, Heating, Surface temperature, Cold weather performance.

46-140
Paleoclimatology.
Crowley, T.J., et al, New York, Oxford University Press, 1991, 339p., Refs. p.274-322. Oxford monographs on geology and geophysics, No.16.
North, G.R.
Models, Ice cores, Global warming, Paleoclimatology, Climatic changes, Ice sheets, Glacial deposits, Oxygen, Carbon dioxide, Sea ice, Sea level, Albedo, Upwelling, Glaciation, Pleistocene, Plankton.
This work summarizes results from both observational and modeling studies in order to assess the general understanding of past climate change. Results from both Quaternary and pre-Quaternary studies and review simulations covering a large number of different models are discussed. Sea ice, Cenozoic temperature trends, deglaciation, the Miocene-Pliocene and Paleozoic glaciations in Antarctica, and the East and West Antarctic ice sheets are among the topics included in this study. (Auth. mod.)

46-141
Geocryological studies. [Geokriologicheskie issledovaniia].
Ershov, E.D., ed, Moscow, Universitet, 1991, 188p., In Russian. Refs. passim. For individual papers see 46-142 through 46-160.
Geocryology, Frozen rocks, Peat, Engineering geology, Deformation, Analysis (mathematics).

46-142
Characteristics of the occurrence and development of frozen rocks on planets in the solar system. [Osobennosti sushchestvovaniia i razvitiia merzlykh porod na planetakh solnechnoi sistemy],
Ershov, E.D., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.3-18, In Russian. 17 refs.
Lebedenko, IU.P., Ershov, V.D., Ruzhanskii, V.E.
Frozen rocks, Extraterrestrial ice, Mars (planet).

46-143
Cryogenic relief formation within aggradation plains. [Kriogennoe rel'efoobrazovanie v predelakh akkumuliativnykh ravnin],
Danilov, I.D., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.19-29, In Russian. 7 refs.
Landforms, Geocryology, Landscape development.

46-144
Inversions of radiocarbon dates in peat bogs in Siberia. [Ob inversii radiouglerodnykh dat v torfianikakh Sibiri],
Ospennikov, E.N., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.29-35, In Russian. 10 refs.
Radioactive age determination, Geocryology, Peat, Swamps.

46-145
Geotechnical systems for urban planning and construction in the cryolithozone. [Geotekhnicheskie sistemy pri gradostroitel'stve v kriolitozone],
Maksimova, L.N., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.36-54, In Russian. 24 refs.
Urban planning, Cold weather construction, Geocryology, Engineering geology.

46-146
Microstructure and properties of rocks, thawed under heat treatment of up to 200C. [Mikrostroenie i svoistva porod, ottaiavshikh pri teplovoi obrabotke do 200C],
Ershov, E.D., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.54-62, In Russian. 11 refs.
Lebedenko, IU.P., Chuvilin, E.M., Khilimoniuk, V.Z.
Geocryology, Frozen rocks, Microstructure, Thawing.

46-147
Controlling the temperature regime of frozen rock massifs. [Upravlenie temperaturnym rezhimom massivov merzlykh porod],
Baranova, N.A., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.62-71, In Russian. 3 refs.
Medvedev, A.V., Parmuzin, S.IU.
Thermal regime, Permafrost control, Geocryology, Analysis (mathematics), Computer applications.

46-148
Algorithm for the approximate calculation of paleotemperatures of rocks based on the current geothermal profile of a geological section. [Algoritm pribliz hennogo vychisleniia paleotemperatury gornykh porod po sovremennomu geotermicheskomu profiliu geologicheskogo razreza],
Baranova, N.A., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.71-78, In Russian. 7 refs.
Khrutskii, S.F.
Analysis (mathematics), Geocryology, Paleoclimatology, Frozen rock temperature, Geothermometry.

46-149
Forecasting the ultimate strength of structurally unstable frozen ground. [Prognoz dlitel'noi prochnosti strukturno-neustoichivykh merzlykh gruntov],
Roman, L.T., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.79-90, In Russian. 7 refs.
Ultimate strength, Geocryology, Frozen ground strength, Forecasting, Analysis (mathematics).

46-150
Strength and deformation of frozen peat under triaxial compression. [Prochnost' i deformiruemost' merzlogo torfa v usloviiakh trekhosnogo szhatiia],
Mironov, V.A., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.91-96, In Russian. 3 refs.
Trofimov, V.I., Smirnov, V.A.
Peat, Geocryology, Compressive properties, Deformation, Strength.

46-151
Thermal regime and thickness of frozen rock massifs in the zone affected by valley taliks in northeastern USSR. [Temperaturnyi rezhim i moshchnost' massivov merzlykh porod v zone vliania dolinnykh talikov Severo-Vostoka SSSR],
Buldovich, S.N., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.97-105, In Russian. 5 refs.
Garagulia, L.S., Parmuzin, S.IU., Tipenko, G.S.
Geocryology, Thermal regime, Taliks, Frozen rock temperature, Thickness, Analysis (mathematics).

46-152
Dynamics of the perennial freezing and thawing of rocks under the superimposition of 300- and 90-year variations in the temperature of the earth's surface. [Dinamika mnogoletnego promerzaniia i ottaivaniia porod pri nalozhenii 300- i 90-letnikh kolebanii temperatury na zemnoi poverkhnosti],
Garagulia, L.S., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.106-116, In Russian. 10 refs.
Romanovskii, V.E., Seregina, N.V.
Geocryology, Temperature variations, Freeze thaw cycles, Rock mechanics, Frozen rocks, Thermodynamics, Mathematical models.

46-153
Applicability of the methods for determining the thermophysical characteristics and phase composition of moisture in the study of saline rocks. [O primenimosti metodik opredeleniia teplofizicheskikh kharakteristik i fazovogo sostava vlagi dlia issledovaniia zasolennykh porod],
Ershov, E.D., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.117-123, In Russian. 5 refs.
Motenko, R.G., Smirnova, N.N., Komarov, I.A.
Geocryology, Saline soils, Frozen rocks, Phase transformations, Moisture.

46-154
Geocryological composition of the coastal zone and bottom of the Baydarata Bay. [Geokriologicheskoe stroenie pribrezhnoi zony i dna Baidaratskoi guby],
Dubikov, G.I., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.124-130, In Russian. 6 refs.
Gamaleia, A.V., Bondarev, V.N., Gritsenko, I.I.
Geocryology, Quaternary deposits, Shores, Bottom sediment.

46-155
Geocryological conditions in the floodplain area of the Lena River (Zelenyy Meadow). [Geokriologicheskie usloviia uchastka poimy r. Leny (Zelenyi Lug)],
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Gordeeva, G.I., Zontov, M.N., Pavlov, I.D.
Geocryology, Floodplains.

46-156
Transformation of the mineral composition of Quaternary deposits in the near-surface cryolithozone (in the example of the central part of the Bol'shezemel'skaya Tundra). [Preobrazovanie mineral'nogo sostava chetvertichnykh otlozhenii v pripoverkhnostnykh usloviiakh kriolitozony (na primere tsentral'noi chasti Bol'shezemel'skoi tundry)].
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Geocryology, Quaternary deposits, Minerals.

46-157
Studying the thermal state of rocks in the Kuvet River valley using electrical exploration methods. [Izuchenie teplovogo sostoianiia porod v doline r. Kuvet elektrorazvedochnymi metodami].
Afanasenko, V.E., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.146-150, In Russian.
Botkov, S.A., Petrukhin, B.P.
Geocryology, Electromagnetic prospecting, Thermal properties, Rock properties, Frozen rocks, Isotherms.

46-158
Processing of electrical profiling data when subdividing territories. [Obrabotka dannykh elektroprofilirovaniia pri raionirovanii territorii].
Rybakov, S.N., et al, Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.151-157, In Russian. 4 refs.
Stepanova, E.N.
Data processing, Geocryology, Electromagnetic prospecting.

46-159
Effect of cryogenesis on the microbial community in soils. [Vliianie kriogeneza na mikrobnye soobshchestva pochv].
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Geocryology, Soil microbiology, Ecology, Bacteria.

46-160
Geological-economic regionalization of the territory of the Taezhnyy industrial center. [Geologo-ekonomicheskoe raionirovanie territorii Taezhnogo promuzla].
Pizhankova, E.I., Geokriologicheskie issledovaniia (Geocryological studies). Edited by E.D. Ershov, Moscow, Universitet, 1991, p.181-187, In Russian. 2 refs.
Geocryology, Economic development, Engineering geology, Permafrost beneath structures.

46-161
Material selection and mix design considerations for constructing asphaltic roads and runways in Canada's north.
Stewart, J.A., et al, *Canadian journal of civil engineering*, June 1991, 18(3), p.407-415, With French summary. 55 refs.
Van Aerde, M.
Roads, Runways, Cold weather construction, Pavements, Construction materials, Design criteria, Cement admixtures, Physical properties, Cold weather performance.

46-162
Behaviour of recycled asphalt pavements at low temperatures.
Sargious, M., et al, *Canadian journal of civil engineering*, June 1991, 18(3), p.428-435, With French summary. 26 refs.
Mushule, N.
Roads, Pavements, Thermal stresses, Low temperature research, Cold weather performance, Cracking (fracturing), Bitumens, Cement admixtures, Temperature effects, Physical properties.

46-163
Rationale for load specifications and load factors in the new CSA code for fixed offshore structures.
Jordaan, I.J., et al, *Canadian journal of civil engineering*, June 1991, 18(3), p.454-464, With French summary. 26 refs.
Maes, M.A.
Offshore structures, Loads (forces), Specifications, Design criteria, Stability, Safety, Petroleum industry, Standards, Forecasting.

46-164
Water droplet impingement on airfoils and aircraft engine inlets for icing analysis.
Papadakis, M., et al, *Journal of aircraft*, Mar. 1991, 28(3), p.165-174, 14 refs.
Elangovan, R., Freund, G.A., Jr., Breer, M.D.
Aircraft icing, Surface properties, Ice forecasting, Air flow, Cloud droplets, Ice removal, Design criteria, Computerized simulation, Accuracy.

46-165
Effects of horizontal tail ice on longitudinal aerodynamic derivatives.
Ranaudo, R.J., et al, *Journal of aircraft*, Mar. 1991, 28(3), p.193-199, 8 refs.
Aircraft icing, Performance, Forecasting, Air flow, Tests, Accuracy, Stability, Measurement.

46-166
***Proposed modifications to ice accretion* icing scaling theory.**
Bilanin, A.J., *Journal of aircraft*, June 1991, 28(6), p.353-359, 22 refs.
Aircraft icing, Theories, Ice accretion, Accuracy, Tests, Models, Ice forecasting, Analysis (mathematics), Cloud droplets.

46-167
Impact ice stresses in rotating airfoils.
Scavuzzo, R.J., et al, *Journal of aircraft*, July 1991, 28(7), p.450-455, 13 refs.
Chu, M.L., Kellackey, C.J.
Aircraft icing, Helicopters, Propellers, Ice crystal adhesion, Stability, Ice cover thickness, Ice loads, Ice solid interface, Shear stress.

46-168
Ancient oceans, ice sheets and the hydrological cycle on Mars.
Baker, V.R., et al, *Nature*, Aug. 15, 1991, 352(6336), p.589-594, 60 refs.
Mars (planet), Hydrologic cycle, Ice formation, Oceans.

46-169
Importance of *Phaeocystis* blooms in the high-latitude ocean carbon cycle.
Smith, W.O., Jr., et al, *Nature*, Aug. 8, 1991, 352(6335), p.514-516, 29 refs.
Plankton, Ice edge, Sea water, Chemical composition.
The Greenland Sea is particularly important to the world ocean circulation, and potentially to carbon dioxide exchange between the ocean and atmosphere, because it is an area of surface convergence and deep-water formation. Previous investigations indicate that biological productivity is low in this area, especially in waters remote from the ice edge. During Apr. and early May 1989, however, a massive bloom of the colonial prymnesiophyte *Phaeocystis pouchetii* developed across much of the Greenland Sea. From measurements of the rate of removal of nitrate from surface waters, it was calculated that the average regional new production was about 40 g C sq m during the 35-day period of the authors' observations. This rate of new production is approximately equal to that observed in other hyperproductive polar regions, such as the Bering Sea and the Bransfield Strait. Because *Phaeocystis* blooms seem to be frequent and widespread in polar oceans, these results suggest that the Greenland Sea may be a larger sink for atmospheric carbon dioxide than has been previously thought. (Auth.)

46-170
Ice wharf enquiry. Report of the NSF task force.
Mellor, M., et al, MP 2945, Washington, D.C., Division of Polar Programs, National Science Foundation, June 1991, 18p. + Attachments 1-23 separately bound, Refs. passim. For papers included as some of the attachments, see 26-3532, 32-296, 32-1631, 38-278, 8-2176, and 44-829, or 9G-18892, 10G-19487, 13G-28590, 14C-29316, or 17F-40759.
Bartholemy, J.L., Fitzsimmons, G.J., Haehnle, R.J., Weeks, W.F.
Ice wharves, Ice cracks, Ice breakup, Ice (construction material), Antarctica—McMurdo Station.
This is the report of a task force appointed by the National Science Foundation to investigate the occurrence of two major cracks which caused the ice wharf at McMurdo Station to break into three large fragments on Feb. 13, 1991. The cargo ship *Green Wave* had just been unloaded and all personnel and material were removed before the breakup. Previous ice wharves were built in 1973, 1976 and 1983, and the present one in Mar.-Sep. 1990, by pumping sea water over the surface and letting the water freeze. It is suggested that the cause of the cracks was most probably flexural failure induced by long-wave swells of about 200 m. Other suggested causes such as concentrated vertical loads from empty shipping containers, ship impact, or bending moments from ship mooring lines, do not seem to have been strong enough in this case. An initial average ice thickness of 20 ft rather than 11 ft and two layers of reinforcing cables rather than one are recommended for future ice wharves.

46-171
Method of measuring frost density using flush-mounted removable disks.
Mao, Y.H., et al, *American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Transactions*, 1991, 97(1), p.26-30, 18 refs.
Besant, R.W., Rezkallah, K.S.
Hoarfrost, Ice density, Ice detection, Heat transfer.

46-172
Computer simulation of a vapor-compression ice generator with a direct-contact evaporator.
Subbaiyer, S., et al, *American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Transactions*, 1991, 97(1), p.118-126, 19 refs.
Andhole, T.M., Helmer, W.A.
Ice makers, Ice refrigeration, Heat transfer, Artificial freezing, Computerized simulation, Artificial ice, Mathematical models.

46-173
Ground-source heat pumps in the Canadian prairies.
Sulatisky, M.T., et al, *American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Transactions*, 1991, 97(1), p.374-385, 17 refs.
Van Der Kamp, G.
Heat recovery, Heat transfer, Heating, Heat sources, Houses, Wells.

46-174
Passive radiator for a refrigerated foundation in permafrost.
Bhargava, R., et al, *American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Transactions*, 1991, 97(1), p.605-609, 1 ref.
Patterson, J., Bassler, D.J.
Permafrost beneath structures, Foundations, Permafrost preservation, Artificial freezing.

46-175
Design of buildings and underground services in cold climates.
Meckler, M., *American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Transactions*, 1991, 97(1), p.610-629, 10 refs.
Permafrost beneath structures, Permafrost preservation, Buildings, Underground facilities, Foundations, Frost protection.

46-176
Practical application of a carbon dioxide monitoring system to control outdoor air in an athletic fieldhouse.
England, R.J., et al, *American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Transactions*, 1991, 97(1), p.620-624, 2 refs.
Thomson, A.J., Ford, B.G.
Monitors, Ventilation, Carbon dioxide, Air pollution, Air flow, Cold weather operation.

46-177
Design strategies for houses in cold-climate regions of Japan.
Yoshino, H., *American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Transactions*, 1991, 97(1), p.625-634, 19 refs.
Houses, Thermal insulation, Ventilation, Building codes, Indoor climates, Cold weather performance.

46-178
Case study of cost-effective low-temperature air distribution, ice thermal storage.
Landry, C.M., et al, *American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Transactions*, 1991, 97(1), p.854-859, 5 refs.
Noble, C.D.
Ice refrigeration, Ventilation, Air conditioning, Cost analysis.

46-179
Modeling of ground-source heat pump performance.
Cane, R.L.D., et al, *American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Transactions*, 1991, 97(1), p.909-925, 29 refs.
Forgas, D.A.
Heat transfer, Soil temperature, Heat recovery, Heat sources, Computer programs, Mathematical models.

46-180
Velocity of dislocations in ice.
Sheatwood, C., et al. *Philosophical magazine A*, Aug. 1991, 64(2), p.289-302, 27 refs.
Whitworth, R.W.
Ice crystal structure, Ice physics, X ray analysis, Proton transport, Ice deformation, Velocity measurement, Ice microstructure, Low temperature tests, Orientation, Topographic features.

46-181
Dynamical forcing and mesoscale organization of precipitation bands in a midwest winter cyclonic storm.
Shields, M.T., et al. *Monthly weather review*, Apr. 1991, 119(4), p.936-964, 36 refs.
Rauber, R.M., Ramamurthy, M.K.
Snowstorms, Fronts (meteorology), Precipitation (meteorology), Atmospheric pressure, Radar echoes, Air flow, Meteorological data.

46-182
Development of a fixed distance snow-melting sprinkler operating at various water flow rates.
Sawase, K., *Railway Technical Research Institute, Quarterly report*, Sep. 1990, 31(3), p.153-159, 3 refs.
Railroad tracks, Snow removal, Snow melting, Water transport, Railroad equipment, Drops (liquids), Water flow, Cold weather performance.

46-183
Development and application of a method to estimate short-term alpine sediment transfer in the Colorado Front Range, U.S.A.
Sumner, R.M., *Mountain research and development*, Nov. 1990, 10(4), p.321-332, With French and German summaries. Refs. p.331-332.
Watersheds, Soil erosion, Slope processes, Talus, Sediment transport, Classifications, Alpine landscapes, Environmental impact, Human factors.

46-184
Mediation of deep supercooling of peach and dogwood by enzymatic modifications in cell-wall structure.
Wisniewski, M., et al. *Planta*, May 1991, 184(2), p.254-260, 19 refs.
Davis, G., Schaffer, K.
Plant tissues, Cold tolerance, Freezing, Supercooling, Interstitial ice, Microstructure, Physical properties, Structural analysis.

46-185
Outer Continental Shelf Environmental Assessment Program; Final reports of principal investigators, Vol.73. Anchorage, AK, U.S. National Oceanic and Atmospheric Administration, Ocean Assessments Division, Alaska Office, May 1991, 451p., OCS MMS 91-0035, Refs. passim. Contains 3 papers.
Subsea permafrost, Permafrost forecasting, Permafrost distribution, Permafrost surveys.

46-186
Influence of air pollutants on groundwater acidification in the Porvoo area, southern Finland.
Soveri, J., *Helsinki. National Board of Waters and the Environment. Water and Environment Research Institute. Publications*, 1991, No.8, p.3-28, With Finnish summary. 8 refs.
Snow impurities, Ground water, Air pollution, Water chemistry, Finland.

46-187
Effect of acidic deposition on the soil and groundwater in the Porvoo area and in a number of background areas.
Soveri, J., *Helsinki. National Board of Waters and the Environment. Water and Environment Research Institute. Publications*, 1991, No.8, p.29-48, With Finnish summary. 14 refs.
Pollution, Soil chemistry, Snow impurities, Ground water, Soil composition, Water chemistry.

46-188
Influence of limestone-dust deposition on groundwater acidification in areas with different deposition levels.
Soveri, J., *Helsinki. National Board of Waters and the Environment. Water and Environment Research Institute. Publications*, 1991, No.8, p.49-66, With Finnish summary. 14 refs.
Pollution, Snow impurities, Soil chemistry, Ground water, Soil composition, Water chemistry.

46-189
Glacier mass balance bulletin. Bulletin No.1 (1988-1989).
World Glacier Monitoring Service, Zurich, 1991, 70p.
Haeberli, W., ed. Herren, E., ed.
Glacier mass balance, Glacier oscillation, Glacier surveys.

46-190
Standard specification for cold weather concreting.
American Concrete Institute, Detroit, Aug. 1990, 5p., ACI 306.1-90. For earlier version see 42-1818.
Winter concreting, Concrete freezing, Standards, Cold weather construction.

46-191
Abnormal formation pressures in the Navarin Basin, Bering Sea, Alaska.
Steffy, D.A., *U.S. Minerals Management Service. Alaska OCS Region. OCS report*, 1991, MMS 91-0034, 75p., PB91-172239, 47 refs.
Exploration, Bottom sediment, Marine geology, Well logging, Offshore drilling, Ocean bottom, Crude oil, Geological surveys, Bering Sea.

46-192
Engineering geology of the Earth.
Dearman, W.R., ed. Moscow, Nauka, 1989, 246p. (Pertinent p.40-76), Refs. passim.
Sergeev, E.M., ed. Shibakova, V.S., ed.
Cryogenic soils, Engineering geology, Permafrost thickness, Permafrost distribution, Permafrost structure, Geocryology, Geomorphology, Ground ice, Ice wedges, Paleoclimatology.
Two chapters are devoted to engineering geology of permafrost regions. The 1st defines the permafrost zone and presents its types, global distribution, and engineering geological conditions. The 2nd chapter discusses selected permafrost regions, including an overview of Antarctica: the source of ice supply, duration of the glaciation, temperatures, and the stationary equilibrium of the ice dome.

46-193
Spatial distribution of microalgae on antarctic fellfield soils.
Davey, M.C., et al, *Antarctic science*, Sep. 1991, 3(3), p.257-263, 42 refs.
Clarke, K.J.
Microbiology, Algae, Soil chemistry, Antarctica - Signy Island.
The horizontal and vertical distributions of cyanobacteria and algae on soil polygons on Signy I. were investigated. Soil chlorophyll concentrations increased from the center to the edge of the polygons. Similar distributions of the non-motile genera, such as *Pseudanabaena* and *Nostoc*, were observed, whereas the motile taxa, *Phormidium* and *Pinnularia*, were evenly distributed across the polygon. *Phormidium autumnale* was the most widespread taxon, and other Oscillatoriaceae were also important. Most of the algal biomass was concentrated near the surface of the soil, although chlorophyll degradation products were found to depths of up to 8 cm. Examination of the soil profile by fluorescence microscopy indicated that a large proportion of the microflora occurred in the zone 0-1 mm below the surface, and scanning electron microscopy confirmed that few algae occurred on the soil surface. It is suggested that this may be a desiccation-avoidance strategy. Vertical migration of the motile microalgae to the soil surface was not observed in the field, but could be induced in the laboratory in the presence of excess water. (Auth. mod.)

46-194
Freshwater stream ecosystems of James Ross Island, Antarctica.
Hawes, I., et al, *Antarctic science*, Sep. 1991, 3(3), p.265-271, 14 refs.
Brazier, P.
Algae, Limnology, Microbiology, Biomass, Streams, Photosynthesis, Antarctica - James Ross Island.
The freshwater streams of James Ross I. share many of the features common to other antarctic streams. There is a diel variation in temperature and discharge, which follows the daily insolation cycle; catchments are barren; stream vegetation is predominantly algal, comprising mat-forming cyanobacteria and filamentous chlorophytes; and physical factors, particularly turbidity and bed stability are important in determining biomass and composition of algal assemblages. Nutrient concentrations vary from stream to stream and over a diel cycle, with minimum dissolved N in late afternoon. Biomass attained and photosynthetic and respiratory rates are also comparable to those recorded in other antarctic streams, with low productivity: biomass ratios in perennial assemblages. (Auth.)

46-195
Ecological and physiological investigations in continental antarctic cryptogams. II. Moisture relations and photosynthesis of lichens near Casey Station, Wilkes Land.
Kappen, L., et al, *Antarctic science*, Sep. 1991, 3(3), p.273-278, 30 refs.
Breuer, M.
Lichens, Photosynthesis, Snow water content, Snow cover effect, Antarctica - Clark Peninsula.
In the second of three field studies on the ecology and physiology of lichens on Clark Peninsula, photosynthetic activity due to natural and artificial soaking of lichen thalli was investigated. Gravimetric measurements were used to quantify water uptake by lichens in contact with snow or ice. Quantum flux density under a 15 cm thick layer of snow can reach light saturation for net photosynthesis of *Usnea sphacelata* at temperatures around 0 C. Measurements with a steady-state CO2 diffusion porometer in the field reveal that in *Usnea antarctica*, *Umbilicaria decussata*, and *U. aprina*, the optimum water content for net photosynthesis was 75-115% d.w. after the thalli were sprayed with water or submerged. The depression of net photosynthesis at super-optimal water content was strong in these species. In naturally soaked *U. sphacelata* this depression was less apparent. The water content resulting from contact with snow is frequently near the optimum for photosynthesis. In the case of continental Antarctica it seems that super-optimal water contents are the exception rather than the rule. (Auth.)

46-196
Classification of antarctic surfaces using AVHRR data: a multispectral approach.
Zibordi, G., et al, *Antarctic science*, Sep. 1991, 3(3), p.333-338, 27 refs.
Melom, G.P.
Spaceborne photography, Image processing, Mapping, Sea ice, Land ice, Radiometry.
The mapping of sea, land ice, sea ice and clouds from Advanced Very High Resolution Radiometer (AVHRR) images taken over Antarctica in daylight is investigated and a classification scheme is proposed on the basis of thresholds retrieved from multispectral patterns of representative data. The scheme, which can be used for real time analysis of AVHRR images in scientific and logistic activities, gives satisfactory separation of different categories. Major misclassification occurs between ice clouds and land ice because of their very similar spectral signatures in the AVHRR channels. Comparison of classified samples, obtained from visual inspection of images and from application of the scheme, exhibits a confusion matrix with accuracy A= 92% over areas almost free from ice clouds. (Auth.)

46-197
Calculation of geopotential and the pressure gradient in the ECMWF atmospheric model: influence on the simulation of the polar atmosphere and on temperature analyses.
Simmons, A.J., et al, *European Centre for Medium-Range Weather Forecasts. Technical report*, July 1990, No.66, 79p., 42 refs. For another version see 45-3478 or 1-44471.
Chen, J.B.
Polar atmospheres, Weather forecasting, Atmospheric circulation, Atmospheric pressure, Air temperature, Topographic effects, Altitude, Mathematical models.
The spectral atmospheric model used for prediction at ECMWF (the European Centre for Medium-Range Weather Forecasts) is modified to change the spectrally represented thermodynamic variable from temperature to the deviation of temperature from reference profile which depends analytically on pressure. There is only a minor change to the form of the thermodynamic equation, and the calculation of the pressure gradient is modified to eliminate some of the cancellation between terms which occurs in the standard formulation. At a lower resolution, the revised scheme significantly improves southern hemispheric forecasts, with differences originating over Antarctica. There is also a small improvement over the Arctic. Sensitivity is much less at a higher resolution, but a minor advantage can still be seen in high southern latitudes. The benefit of the revised scheme at high latitudes is also captured by a simpler revision which retains temperature as the spectrally-represented variable, and uses a reference temperature only in the computation of the pressure-gradient terms in gridpoint space. Results indicate that much of the systematic difference in behavior between lower and higher resolution simulations at high latitudes can be removed by changing the pressure-gradient calculation. In particular, the new schemes correct a systematic tendency for erroneously high pressures east of the Ross Ice Shelf over Antarctica in lower resolution simulations at medium and longer time ranges. A small beneficial impact of the revised pressure-gradient calculation is found in a two-day data-assimilation experiment at a higher resolution. A more substantial improvement comes from using the reference temperature to reduce a systematic error in the calculation of first-guess geopotential heights at standard pressure levels. Results from forecasts carried out after one and two days of assimilation show small improvements in the short and early medium range, but are inconclusive at longer time ranges. (Auth. mod.)

46-198
Holocene slope processes of periglacial mountain areas in Scandinavia and Poland.
Jonasson, C., *Uppsala. Universitet. Naturgeografiska institutionen. UNGI rapport*, 1991, No.79, 156p., Refs. p.143-151.
Slope processes, Periglacial processes, Solifluction, Sediment transport, Paleoclimatology, Radiocarbon age determination, Lacustrine deposits, Alpine glaciation, Sweden, Norway, Poland.

46-199
Report of the International Ice Patrol in the North Atlantic, 1989 season.
U.S. Coast Guard, *U.S. Coast Guard. Bulletin*, 1989, No.75, 97p., CG-188-44, 17 refs.
Ice reporting, Sea ice distribution, Ice conditions, Icebergs, Ice detection, Drift.

46-200
Arctic oceanography.
Curtin, T.B., et al, *Oceanus*, 1990-91, 33(4), p.58-66.
Untersteiner, N., Callaham, T.
Oceanography, Research projects, Sea ice distribution, Climatology, Ocean currents.

46-201
Experimental studies of nonexplosive loosening of permafrost rocks in a diamond deposit.
Shishkin, IU.P., et al. *Soviet mining science*. May 1991, 26(4), p.362-366. Translated from Fiziko-tekhnicheskie problemy razrabotki poleznykh iskopaemykh, 1990, No.4. 4 refs.
Mikulevich, A.P., Burakov, A.M.
Mining, Ground thawing, Chemistry, Artificial thawing, Cold weather construction, Permafrost transformation, Geochemistry, Chemical properties.

46-202
Fine structure of freezing potential of aqueous lithium chloride solutions and its oscillation due to trace ethanol.
Ozeki, S., et al. *Langmuir*. May 1991, 7(5), p.821-823, 13 refs.
Solutions, Ice water interface, Ice formation, Freezing potential (electrical), Temperature variations, Ice structure, Charge transfer, Ice electrical properties, Chemical analysis.

46-203
Numerical solution of heat conduction with freezing in cylinders of arbitrary cross-section.
Huang, C.L., et al. National Heat Transfer Conference, Philadelphia, PA, Aug. 6-9, 1989. Multiphase flow, heat and mass transfer. Edited by R.K. Shah, New York, NY, American Society of Mechanical Engineers, 1989, p.9-15, HTD-Vol.109, 20 refs.
Schreiber, W.C., Chuan, C.H.
DLC TJ260.M85 1989
Phase transformations, Freezing, Thermal conductivity, Liquid solid interfaces, Solidification, Enthalpy, Freezing front, Mathematical models.

46-204
Melting of a frozen porous medium in the presence of natural convection.
Chellaiah, S., et al. National Heat Transfer Conference, Philadelphia, PA, Aug. 6-9, 1989. Multiphase flow, heat and mass transfer. Edited by R.K. Shah, New York, NY, American Society of Mechanical Engineers, 1989, p.21-29, HTD-Vol.109, 18 refs.
Viskanta, R.
DLC TJ260.M85 1989
Porous materials, Phase transformations, Ice melting, Convection, Thermal conductivity, Liquid solid interfaces, Mathematical models, Temperature distribution.

46-205
Experimental and numerical investigation on thermal stress during water solidification in a cylindrical brass tube.
Lin, S., et al. National Heat Transfer Conference, Philadelphia, PA, Aug. 6-9, 1989. Multiphase flow, heat and mass transfer. Edited by R.K.Shah, New York, NY, American Society of Mechanical Engineers, 1989, p.67-72, HTD-Vol.109, 9 refs.
Gao, D.Y., Yu, X.C.
DLC TJ260.M85 1989
Ice water interface, Pipes (tubes), Freezing, Thermal stresses, Thermal expansion, Ice breaking, Mechanical properties, Solidification, Analysis (mathematics).

46-206
Interlocking mats support drilling rig on frozen swamp. *Oil & gas journal*. Apr. 15, 1991, 89(15), p.48-49.
Oil wells, Foundations, Drilling, Cold weather operation, Materials, Environmental protection, Swamps, Frozen ground compression.

46-207
Where should the cooling rate be determined in an extended freezing sample.
Hartmann, U., et al. *Cryobiology*. Apr. 1991, 28(2), p.115-130, 32 refs.
Sunner, B., Körber, C., Rau, G.
Solutions, Cooling rate, Freezing, Laboratory techniques, Temperature measurement, Cryobiology, Accuracy, Sensors.

46-208
Periodic drainage of ice-dammed lakes as a result of variations in glacier velocity.
Knight, P.G., et al. *Hydrological processes*. Apr.-June 1991, 5(2), p.175-184, 20 refs.
Tweed, F.S.
Glacial lakes, Lake bursts, Glacier flow, Subglacial drainage, Glacial hydrology, Ice dams, Flow rate, Geomorphology, Flood forecasting, Iceland

46-209
Recent glacier changes in the Wind River Range, Wyoming.
Marston, R.A., et al. *Physical geography*. Apr.-June 1991, 12(2), p.115-123, 25 refs.
River basins, Glacier melting, Glacier thickness, Water storage, Water supply, Runoff forecasting, Meltwater, Radio echo soundings, Glacier mass balance, Stereophotography, United States--Wyoming

46-210
Spatial and temporal climatology of snowstorms in the Deep South.
Suckling, P.W., *Physical geography*. Apr.-June 1991, 12(2), p.125-139, 29 refs.
Snowstorms, Distribution, Periodic variations, Synoptic meteorology, Snow accumulation, Climatology, Statistical analysis.

46-211
Dielectric constant and layer-thickness interpretation of helicopter-borne short-pulse radar waveforms reflected from wet and dry river-ice sheets.
Arcone, S.A., *IEEE transactions on geoscience and remote sensing*. Sep. 1991, 29(5), MP 2946, p.768-777, 19 refs.
River ice, Ice cover thickness, Dielectric properties, Radar echoes, Airborne radar, Melting, Wave propagation, Ice bottom surface, Ice water interface.
Analysis of short-pulse radar data taken over river ice sheets in late spring reveals that radar signal penetration of an ice sheet and determination of its thickness are not necessarily prevented by the presence of surface water or internal melting. Radar data for both wet and dry ice were extracted from surveys performed from a helicopter operating at an altitude of about 2-7 m and a speed of about 5 m/s over the Connecticut River near *Windsor, Vermont*. The radar used a broadband wavelet of several nanoseconds duration at a center frequency of about 500 MHz. By use of plane wave theory, the dielectric constant of ice is interpreted from the amplitudes of reflections from a solid ice sheet. This verification of plane-wave interpretation and the lack of dispersion seen in wet ice bottom returns are then used to interpret data from segments of a wet ice sheet survey for both ice thickness and surface water depth. Other ice sheet segments, for which the data allow only sporadic interpretation of ice depth, are interpreted as having internal melting. It is concluded that ice thickness can be determined for surface water layers less than about 8 mm thick for the particular wavelet used, so long as the ice interfaces are not severely rough.

46-212
Modelling the effect of climatic warming on the Hofsjökull ice cap, central Iceland.
Jóhannesson, T., *Nordic hydrology*. 1991, 22(2), p.81-94, 14 refs.
Global warming, Climatic changes, Glacier oscillation, Glacier melting, Air temperature, Ice models, Computerized simulation, Glacier mass balance, Carbon dioxide.

46-213
Influence of uncertainty in air temperature and albedo on snowmelt.
Blöschl, G., *Nordic hydrology*. 1991, 22(2), p.95-108, 29 refs.
Snowmelt, Snow water equivalent, Alpine landscapes, Air temperature, Albedo, Temperature effects, Snow hydrology, Simulation, Runoff forecasting, Accuracy.

46-214
Neutron-diffraction study of phase transitions of high-pressure metastable ice VIII.
Balagurov, A.M., et al. *JETP letters*. Jan.-June 1991, 53(1), p.30-34. Translated from Pis'ma v zhurnal eksperimental'noi i teoreticheskoi fiziki. 13 refs.
High pressure ice, Amorphous ice, Phase transformations, Neutron diffraction, Temperature effects, Ice physics, Low temperature research.

46-215
Oil and gas development on Alaska's North Slope: past results and future prospects.
Banet, A.C., Jr., *U.S. Bureau of Land Management. Alaska State Office. BLM-Alaska open file report*. Mar. 1991, No.34, 42p., 11 refs.
Exploration, Petroleum industry, Economic development, Natural resources, Crude oil, Natural gas, United States--Alaska--North Slope.

46-216
Sludge dewatering in a freezing bed—a pilot-scale study.
Martel, C.J., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Report*. Apr. 1991, CR 91-06, 14p., ADA-235 995, 11 refs.
Diener, C.J.
Sludges, Waste treatment, Freeze thaw cycles, Insolation, Cold weather performance, Meltwater, Water treatment, Design, Temperature effects, Cold weather tests.
In 1986 a pilot-scale sludge freezing bed was constructed at the U.S. Army Cold Regions Research and Engineering Laboratory in Hanover, NH. This bed was operated over the next three years using both anaerobically and aerobically digested sludges. These tests demonstrated that both sludges can be effectively dewatered by this process. The final solid contents were 39.3% and 24.5% for anaerobically digested and aerobically digested sludges, respectively. The quality of the meltwater was similar to raw wastewater. Odors were not a problem if the meltwater was drained away as quickly as it formed. Both sludges were easily removed with a front-end loader. The actual depth of sludge frozen and thawed in the bed during each year of operation was very close to that predicted by design models.

46-217
Numerical modeling of Stefan problems.
Asaithambi, N.S., *Mathematical and computer modelling*. 1990, Vol.14, International Conference on Mathematical and Computer Modelling in Science and Technology, 7th, Chicago, IL, Aug. 2-5, 1989. Proceedings. Edited by X.J.R. Avula, p.139-144, 14 refs.
Stefan problem, Ice water interface, Ice melting, Mathematical models, Computer programs, Liquid solid interfaces.

46-218
Automatic transmission fluids (ATFs)—the improvement of low temperature characteristics.
Schindel, U.F., *Lubrication engineering*. June 1991, 47(6), p.463-467, 3 refs.
Lubricants, Motor vehicles, Physical properties, Admixtures, Viscosity, Chemical composition, Temperature effects, Polymers.

46-219
Quasifrozen dusty laminar boundary layer on a blunt body.
Agranat, V.M., et al. *Fluid dynamics*. May 1991, 25(6), p.953-956, Translated from Izvestiia Akademii nauk SSSR, Mekhanika zhidkosti i gaza, 1990, No.6, 9 refs.
Milovanova, A.V.
Laminar flow, Fluid dynamics, Aerosols, Boundary layer, Gases, Boundary value problem, Analysis (mathematics), Hydrodynamics.

46-220
Effect of glacier morphology on surficial geology and glacial stratigraphy in a high arctic mountainous terrain.
Evans, D.J.A., *Zeitschrift für Geomorphologie*. Dec. 1990, 34(4), p.481-503, With German and French summaries. 35 refs.
Glacial geology, Mountains, Glaciation, Glacial deposits, Landforms, Stratigraphy, Moraines.

46-221
Movement of rock glacier Macun 1 from 1965-1988 (Lower Engadine, Graubünden, Switzerland). [Die Bewegungen des Blockgletschers Macun 1 von 1965-1988 (Unterengadin, Graubünden, Schweiz)].
Barsch, D., et al. *Zeitschrift für Geomorphologie*. Mar. 1991, 35(1), p.1-14, In German with English and French summaries. 16 refs.
Zick, W.
Rock glaciers, Sediment transport, Talus, Ice deformation, Ground ice, Dislocation (materials), Shear stress, Velocity measurement.

46-222
Case study of soil erosion on frozen ground in the river Lärjeån valley, NE Göteborg, SW Sweden.
Franzén, L.G., *Zeitschrift für Geomorphologie*. Mar. 1991, 35(1), p.39-45, With German and French summaries. 9 refs.
Soil erosion, Precipitation (meteorology), Water erosion, Frost action, Ground thawing, Runoff, Frozen ground, Saturation, River basins.

46-223
Statistical approach to field measurements of the chemical evolution of cold (< 0C) snow cover.
Laberge, C., et al. *Environmental monitoring and assessment*. May-June 1991, 17(2-3), p.201-216, 19 refs.
Jones, G.
Snow surveys, Air pollution, Sampling, Snow cover stability, Snow impurities, Chemical composition, Temperature effects, Statistical analysis, Accuracy, Environmental tests, Chemical properties.

46-224
Application of a coupled ice-ocean model to the Labrador Sea.
Mysak, L.A., et al. *Atmosphere-Ocean*. June 1991, 29(2), p.232-255, With French summary. 32 refs.
Peng, S., Wood, R.G.
Air ice water interaction, Ocean currents, Sea ice distribution, Climatology, Wind factors, Ice edge, Simulation, Mathematical models, Air temperature, Ice cover thickness, Labrador Sea.

46-225
Backscattersonde: a new instrument for atmospheric aerosol research.
Rosen, J.M., et al. *Applied optics*, Apr. 20, 1991, 30(12), p.1552-1561, 14 refs.
Kjome, N.T.
Atmospheric physics, Backscattering, Aerosols, Sounding, Measuring instruments, Design, Photometry, Airborne equipment, Ice crystal optics, Stratosphere.

46-226
Norwegians build interesting ships. *Shipping world & shipbuilder*, May 1991, 191(4073), p.156-158.
Icebreakers, Construction, Specifications, Design.

46-227
Ice going ships and technology. *Shipping world & shipbuilder*, Oct. 1990, 190(4067), p.329-338.
Ships, Icebreakers, Construction, Design, Specifications.

46-228
Proceedings.
International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991, Golden, CO, International Society of Offshore and Polar Engineers, 1991, 4 vols., Refs. passim. For selected papers see 46-229 through 46-253.
Triantafyllou, M.S., ed. Karal, K., ed. Chung, J.S., ed. Hartnup, G.C., ed. Gowda, S.S., ed.
Meetings, Offshore structures, Sea ice, Ice solid interface, Ice mechanics, Cold weather construction, Ice scoring, Loading, Icebergs, Icebreakers, Ice cover thickness, Design criteria, Protection.

46-229
Finnish arctic offshore research programme.
Enkvist, E., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.425-433, 14 refs.
Eranti, E.
Ocean environments, Research projects, Offshore structures, Cold weather construction, Ice solid interface, Sea ice, Icebreakers, Petroleum industry, Design criteria, Finland.

46-230
Development of Australian antarctic building types.
Incoll, P.G., International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.434-442, 4 refs.
Buildings, Modular construction, Design, Cold weather construction.
In this article the main building types used by Australia in Antarctica are described, including circumstances and needs governing the design, a technical description, experience in use, and comments on strengths and weaknesses of the designs. Current directions of development are provided as a conclusion. (Auth. mod.)

46-231
Modelling of snowdrift around prismatic buildings for antarctic environment.
Kim, D.H., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.443-450, 23 refs.
Kwok, K.C.S., Smedley, D.J., Rohde, H.F.
Snowdrifts, Simulation, Snow accumulation, Buildings, Design criteria, Forecasting, Ice solid interface, Wind tunnels.
In this paper, a number of similarity criteria, in particular time scaling, for the physical modelling of snowdrift in a wind tunnel are examined. Modeling of snowdrift was conducted in a purpose-built turbulent boundary layer wind tunnel. Iversen's (1980) proposed dimensionless time, which includes scaling of particle and fluid densities, Froude Number, particle threshold speed, mean wind speed, time and length, was found to produce a reasonable correlation of snowdrift accumulation rates between model and prototype. Tests were also carried out to investigate the relationships between different dimensions of prismatic buildings and snowdrift. The results were used to formulate design guidelines for buildings in Antarctica. (Auth. mod.)

46-232
Remote sensing of icebergs in the Barents Sea during SIZEX 89.
Sandven, S., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.451-456, 8 refs.
Kloster, K., Johannessen, O.M.
Icebergs, Radar tracking, Airborne radar, Synthetic aperture radar, Grounded ice, Resolution, Pack ice, Detection.

46-233
Beaufort Sea ice thickness measurements from an acoustic, under ice, upward looking ice keel profiler.
Pilkington, G.R., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.456-461, 9 refs.
Wright, B.D.
Sea ice, Pressure ridges, Ice cover thickness, Acoustic measurement, Subglacial observations, Ice growth, Underwater acoustics.

46-234
Stamukhi on the northern Sakhalin offshore.
Astaf'ev, V.N., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.462-466, 3 refs.
Polomoshnov, A.M., Truskov, P.A.
Sea ice, Ice surveys, Pressure ridges, Ice scoring, Ice cover thickness, Design criteria, Underground pipelines.

46-235
Scour depths distribution on the northern Sakhalin offshore.
Truskov, P.A., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.467-470, 5 refs.
Surkov, G.A.
Sea ice, Ice scoring, Distribution, Pressure ridges, Simulation, Offshore structures, Underground pipelines, Design criteria.

46-236
Long range detection of icebergs using ground wave radar.
Srivastava, S.K., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.471-476, 8 refs.
Ponsford, A.M.
Icebergs, Radar tracking, Detection, Radar echoes, Drift, Performance.

46-237
Investigation of floating plate stability by the boundary element method.
Ushakov, A.A., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.477-480, 5 refs.
Khrapatyĭ, N.G., Takhteev, V.A.
Floating ice, Stability, Ice water interface, Ice breaking, Hydrodynamics, Analysis (mathematics).

46-238
Dynamical problems of ice cover fracture.
Pushkin, A.V., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.481-488, 5 refs.
Slepian, L.I., Zlatin, A.N.
Sea ice, Ice cover strength, Cracking (fracturing), Crack propagation, Ice water interface, Analysis (mathematics), Ice elasticity, Water waves.

46-239
General theory of dynamic ice structure interaction with applications.
Eranti, E., International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.489-498, 14 refs.
Offshore structures, Ice loads, Ice solid interface, Dynamic loads, Impact strength, Floating ice, Analysis (mathematics), Ice edge.

46-240
Measurement of ice forces on light piers in the St. Lawrence Seaway.
Frederking, R.M.W., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.499-504, 14 refs.
Sayed, M., Penney, G.
River ice, Channels (waterways), Piers, Offshore structures, Ice loads, Measurement, Ice pressure, Design criteria.

46-241
Wave deformation of sea ice floes in the Antarctic due to storms and icebergs.
Smirnov, V.N., International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.510-514, 9 refs.
Ice floes, Ocean waves, Deformation, Drift, Wave propagation, Wind factors, Ice water interface, Spectra.
Processes of wave generation in the antarctic sea ice are considered. Wind, swell and icebergs are main sources of elastic and gravity waves of wide dynamical and frequency ranges. Self-excited oscillations, similar to those taking place during splitting of the ice by engineering constructions, occurred at interactions between drifting ice and icebergs. (Auth. mod.)

46-242
New aspects of ice/structure interaction problems.
Alekseev, IU.N., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.515-519, 9 refs.
Beliashov, V.A., Sazonov, K.E., Starovoitov, O.M.
Sea ice, Ice solid interface, Offshore structures, Ice mechanics, Ice loads, Ice pressure, Analysis (mathematics).

46-243
Submudline production systems as a solution to iceberg hazards.
Edwards, W.G., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.520-527.
Dallimer, D.S.
Icebergs, Offshore structures, Damage, Design, Subsurface structures, Protection, Oil wells.

46-244
Comparison of the atmospheric icing on two different size cables.
Druez, J., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.528-534, 10 refs.
McComber, P.
Power line icing, Cables (ropes), Ice loads, Cloud droplets, Icing rate, Ice storms, Ice forecasting, Physical properties.

46-245
Predicting creep displacements of laterally loaded piles in ice and ice-rich materials.
Morin, P., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.535-542, 18 refs.
Pile load tests, Ice solid interface, Dislocations (materials), Ice creep, Rheology, Structural analysis, Analysis (mathematics).

46-246
Investigation of sea spray icing on offshore structure.
Mizuno, Y., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.543-547, 4 refs.
Hirasawa, M., Yano, K., Tokikawa, K.
Offshore structures, Sea spray, Ice formation, Ice cover thickness, Pipes (tubes), Temperature effects.

46-247
Behaviour of steel-concrete composite members for arctic offshore structures.
Gowda, S.S., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.548-555, 7 refs.
Hassinen, P.
Offshore structures, Steel structures, Concrete structures, Loading, Ultimate strength, Structural analysis, Composite materials, Ice loads, Construction materials, Mechanical tests.

46-248
On the mechanism of ship hull dents caused by ice pressure.
Tamura, K., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.556-561, 4 refs.
Arita, M.
Icebreakers, Ice solid interface, Ice loads, Deformation, Ice pressure, Mechanical tests, Design criteria.

46-249
Ice loading on open and ducted propellers.
Browne, R.P., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.562-570, 5 refs.
Keinonen, A.J., Semery, P.
Ships, Sea ice, Underwater ice, Propellers, Ice loads, Performance, Ice solid interface, Design criteria, Hydrodynamics.

46-250
Ice-resistance enamels for ice-breakers and offshore structures.
Gladkov, M.G., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.571-573, 1 ref.
Moiseeva, I.P., Sidorova, L.G.
Offshore structures, Icebreakers, Protective coatings, Materials, Ice solid interface, Ice adhesion.

46-251
Metal mining in polar regions.
Lyons, D., International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.2. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.574-581, 56 refs.
Mining, Cold weather operation, Economic development, Environmental impact.
Mining has been prominent on the antarctic agenda for two decades. The Antarctic Treaty Nations have recently moved away from plans to regulate mining, towards a legal prohibition. Over the same decades metal mines have been developed in the Arctic. The long term effectiveness of controls on mining in Antarctica may depend on the absence of any real pressure to mine. In this paper, the development and operation of metal mining projects in the Arctic are reviewed, and a preliminary assessment is made of some of the technological and operational factors influencing the feasibility of similar ventures in the Antarctic. (Auth. mod.)

46-252
Effect of fluid force acting on the colliding body upon the elastic-plastic response of an offshore structure.
Ueda, Y., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.4. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.148-155, 13 refs.
Murakawa, H., Xiang, D.X.
Offshore structures, Ice solid interface, Impact, Stability, Loading, Analysis (mathematics), Ships, Structural analysis, Fluid dynamics.

46-253
Improved local corrosion resistance of welds of Y.F. 350 N/sq mm class steels for use in icy seas.
Kumakura, Y., et al, International Offshore and Polar Engineering Conference, First, Edinburgh, United Kingdom, Aug. 11-16, 1991. Proceedings, Vol.4. Edited by M.S. Triantafyllou et al, Golden, CO, International Society of Offshore and Polar Engineers, 1991, p.245-252, 8 refs.
Steels, Offshore structures, Welding, Cold weather performance, Corrosion, Construction materials, Sea water, Design criteria.

46-254
Seismological investigations of a west antarctic ice stream.
Blankenship, D.D., Madison, University of Wisconsin, 1989, 265p., University Microfilms order No.-DA8917633, Ph.D. thesis. 66 refs.
Ice sheets, Glacier flow, Seismic surveys, Basal sliding, Seismic reflection, Glacier surveys, Analysis (mathematics), Antarctica—West Antarctica.
The question of what controls the dynamics of the fast-moving ice streams that drain the West Antarctic ice sheet is addressed using seismic reflection techniques. Specifically, experiments performed near the Upstream B camp (UpB) on ice stream B were designed to test for a lubricating layer beneath the ice stream as well as for a preferred orientation of crystals within the ice. A lubricating layer would cause sliding of the ice over its bed and oriented crystals might be responsible for enhanced rates of deformation within the ice. Using seismic reflection profiles at near-vertical incidence, a laterally continuous layer was identified at the base of the ice. The top of this layer is smooth and its base is characterized by flutes trending parallel to ice flow. Oblique seismic reflections indicate that the layer is a saturated, unconsolidated sediment. The velocity anisotropy for reflected shear waves observed on ice stream B shows that the ice crystals are not oriented for easy horizontal shearing. Polarization of these shear waves are instead consistent with a down-flow axis of symmetry for the crystalline fabric. (Auth. mod.)

46-255
Linear finite element analysis of the composite ice wall.
Wang, C.Y., Beaumont, TX, Lamar University, 1989, 190p., University Microfilms order No.MA1338943, M.S. thesis. 37 refs.
Ice loads, Offshore structures, Ice control, Composite materials, Walls, Ice pressure, Mathematical models.

46-256
Diesel engine startability and white smoke formation under cold temperature conditions.
Zahdeh, A.R., Detroit, MI, Wayne State University, 1990, 291p., University Microfilms order No.-DA9029666, Ph.D. thesis. 104 refs.
Diesel engines, Engine starters, Cold weather performance, Air pollution, Mathematical models.

46-257
Performance and shear interaction in two-layered systems of high-strength cold weather concrete repair materials in sub-freezing temperatures.
Kudlapur, S.T., New Brunswick, NJ, Rutgers University, 1990, 286p., University Microfilms order No.-DA9034919, Ph.D. thesis. 138 refs.
Concrete freezing, Concrete strength, Frost resistance, Winter maintenance, Cold weather performance, Concrete admixtures, Shear strength, Analysis (mathematics).

46-258
Experimental study of ice accretion and wind loading on offshore supply boats.
Hayhoe, R.D., Edinburgh, Scotland, Heriot-Watt University, 1989, 188p., British Library and University Microfilms order No.DX90554, Ph.D. thesis. 101 refs.
Ship icing, Ice accretion, Wind pressure, Sea spray, Wind tunnels, Analysis (mathematics), Ice loads.

46-259
Hydrology in mountainous regions. II. Artificial reservoirs; water and slopes.
Sinniger, R.O., ed, *International Association of Hydrological Sciences. IAHS publication,* 1990, No.194, 446p., In English and French. Refs. passim
Proceedings of the Symposium on the Impact of Artificial Reservoirs of Hydrological Equilibrium and the Symposium on the Role of Water in the Morphological Evolution of Slopes, Lausanne, Switzerland, Aug. 27-Sep. 1, 1990. For selected papers see 45-1974 and 45-1975, 46-260 and 46-261, 46-263 through 46-265, and 46-267 and 46-268.
Monbaron, M., ed.
Floods, Mudflows, Snowmelt, Sediment transport, Reservoirs, Runoff, River flow.

46-260
Geomorphological impact of modified river discharge and sediment transport regimes downstream of hydropower scheme meltwater intake structures.
Gurnell, A.M., et al, *International Association of Hydrological Sciences. IAHS publication,* 1990, No.194, Hydrology in mountainous regions. II. Artificial reservoirs; water and slopes. Edited by R.O. Sinniger and M. Monbaron, p.165-170, 12 refs.
Clark, M.J., Hill, C.T.
Meltwater, Water intakes, Sediment transport, Glacial rivers, River flow, Reservoirs.

46-261
Sediment yield in the aftermath of a dambreak flood in a mountain stream.
Bathurst, J.C., et al, *International Association of Hydrological Sciences. IAHS publication,* 1990, No.194, Hydrology in mountainous regions. II. Artificial reservoirs; water and slopes. Edited by R.O. Sinniger and M. Monbaron, p.287-294, 8 refs.
Snowmelt, Sediment transport, Floods, Dams.

46-262
Evaluation of a portable electromagnetic induction instrument for measuring sea ice thickness.
Kovacs, A., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* June 1991, CR 91-12, 17 refs., ADA-240 974, 12 refs.
Morey, R.M.
Ice cover thickness, Electromagnetic prospecting, Sounding, Ice surveys, Sea ice, Measuring instruments.
Field trials using a man-portable Geonics Ltd., EM31 electromagnetic induction sounding instrument, with a plug-in data processing module, for the remote measurement of sea ice thickness, are discussed. The processing module was made by Flow Research, Inc., to directly measure sea ice thickness and show the result in a numerical display. The EM31-processing module system was capable of estimating ice thickness within 10% of the true value for ice from about 0.7 to 3.5 m thick, the oldest undeformed ice in the study area. However, since seawater under the arctic pack ice has a relatively uniform conductivity (2.5 +/- 0.05 S/m), a simplified method, which can be used for estimating sea ice thickness using just an EM31 instrument, is discussed. It uses only the EM31's conductivity measurement, is easy to put into use and does not rely on theoretically derived look-up tables or phasor diagrams, which may not be accurate for the conditions of the area.

46-263
Floods in the high Sierra Nevada, California, USA.
Kattelmann, R.C., *International Association of Hydrological Sciences. IAHS publication,* 1990, No.194, Hydrology in mountainous regions. II. Artificial reservoirs; water and slopes. Edited by R.O. Sinniger and M. Monbaron, p.311-317, 25 refs.
Floods, Snowmelt, Rain, Snow cover distribution, Thunderstorms, Snow water equivalent, United States—California—Sierra Nevada.

46-264
Hydrology and morphological consequences of the 1987 flood event in the upper Reuss valley.
Naef, F., et al, *International Association of Hydrological Sciences. IAHS publication,* 1990, No.194, Hydrology in mountainous regions. II. Artificial reservoirs; water and slopes. Edited by R.O. Sinniger and M. Monbaron, p.339-346, 15 refs.
Bezzola, G.R.
Floods, Snowmelt, River flow, Rain, Runoff, Switzerland—Alps.

46-265
Anomalous hydrological behaviour of an Alpine stream (Val'n. Poschiavo, southern Switzerland) and its interpretation in terms of the geology of the catchment.
Naef, F., et al, *International Association of Hydrological Sciences. IAHS publication*, 1990, No.194, Hydrology in mountainous regions. II. Artificial reservoirs; water and slopes. Edited by R.O. Sinniger and M. Monbaron, p.347-354, 10 refs.
Horat, P., Milnes, A.G., Hoehn, E.
Floods, Mudflows, Snowmelt, Runoff, Water storage, Streams, River flow, Switzerland—Alps.

46-266
Potential influences of common well casings on metal concentrations in well water with low dissolved oxygen.
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Particle size has opposing effects on the effectiveness of freeze - thaw sludge conditioning. Small particles migrate easily and coagulate into larger particles during freezing, but small particles also cause poor sludge dewaterability. Since agitation can change particle size, the effects of agitation on sludge dewatering before and after freeze thaw conditioning is of practical significance. The capillary suction time (CST) device is used to measure the dewaterability of several water and wastewater treatment sludges before and after freeze/thaw. The results show that preagitation may have a detrimental effect on the dewaterability of some sludges after freeze thaw conditioning. For other sludges such as raw primary sludges that have large initial particle size distributions, agitation prior to freeze thaw will not be detrimental to subsequent dewatering. Postagitation clearly has a substantial deleterious effect on dewaterability, leading to the conclusion that if freeze thaw is used for conditioning, the thawed sludge should undergo minimum agitation before dewatering. (Auth.)

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46-310
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Frost heave, Gas pipelines, Underground pipelines, Pipeline freezing.

46-314
Performance of airport PCC pavements during spring thaw periods.
Janoo, V.C., et al, MP 2948, Aircraft-pavement interaction; an integrated system. Edited by P.T. Foxworthy, New York, American Society of Civil Engineers, 1991, p.306-322, 13 refs. Proceedings of a conference, Kansas City, MO, Sep. 4-6, 1991.
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Pavements, Runways, Thaw weakening, Seasonal freeze thaw, Concretes.
The portland cement concrete (PCC) pavements at two Wisconsin airports, central Wisconsin Airport in Mosinee, and Outagamie County Airport in Appleton, were monitored during spring thaw in 1986. To evaluate pavement performance during this period, falling weight deflections were taken. In addition, surface and subsurface temperatures were measured at selected sites at the two airports. Since the current Federal Aviation Administration PCC pavement design criterion is based on limiting the bending stresses in the concrete slab under edge loading conditions, the major portion of the evaluation was on load transfer during the spring thaw period. This paper presents the results of the field study at these two airports.

46-315
Effect of variations in air speed on cross-flow cylinder frosting.
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Pipes (tubes), Hoarfrost, Ice growth, Heat transfer, Air flow, Surface temperature, Ice solid interface, Velocity measurement, Air conditioning.

46-316
Fire severity, ash deposition, and clipping effects on soil nutrients in chaparral.
Marion, G.M., et al, *Soil Science Society of America. Journal*, Jan.-Feb. 1991, 55(1), MP 2949, p.235-240, 22 refs.
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Forest fires, Soil chemistry, Nutrient cycle.
Fire may affect soil nutrient status by direct addition of nutrients and by indirectly altering the soil environment. The objective of this study was to examine how fire severity, ash deposition, and clipping affect posttreatment soil nutrient status. There were eight experimental treatments designed to examine increasing fire severity, ash (nutrient) addition independent of fire severity, clipping to study competition for nutrients per se, and untreated controls. Fire severity affected both the quality and quantity of ash. Increasing fire severity increased the concentrations of Mg and K and decreased the concentrations of NH_4-N and NO_3-N in the ash. As fire severity increased, there was an increasing recovery of ash relative to standing biomass (10-18 g/kg). Fire increased the availability of all nutrients (NH_4-N, NO_3-N, PO_4-P, Ca, Mg and K). This nutrient enhancement was largely restricted to the surface soil (0-5 cm), only soluble N appeared to increase in the subsurface soil (5-10 cm). The soil quantities of NH_4-N increased and NO_3-N decreased with increasing fire severity, suggesting either a direct addition of variable amounts of these N ions or an indirect effect on postfire nitrification rates. Clipping had no effect on enhancing soil nutrient availability. The apparent recovery of the basic cations in the water extracts of the ash samples was in the order: K > Mg > Ca; this was different from the subsequent recovery in the soil: Ca > K > Mg. It was hypothesized that the relative recovery of basic cations in the water extracts of the ash samples was controlled by the solubility of Ca, Mg, and K salts.

46-317
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Vitreous ice, Nucleation, Cryobiology, Ice nuclei, Organic nuclei, Cold weather survival, Solid phases.

46-318
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46-319
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Icebreakers, Ice navigation, Ice breaking, Tests, Performance.

46-322
Model scale manoeuvring tests in ice with systematically varied hull shape. Part 1.
Lindström, C.A., *Helsinki University of Technology. Arctic Offshore Research Centre. Report*, 1990, M-17, 24p. + appends., 3 refs.
Ice navigation, Ice loads, Ships, Ice models, Mathematical models.

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Ice edge, Ice loads, Ice navigation, Ice breaking, Ice cracks, Ice pressure, Mathematical models, Computer programs.

46-324
Antarctica—nature and man. [Antarktyka—przyroda i czlowiek].
Rakusa-Suszczewski, S., et al, Wroclaw, Zaklad Narodowy imienia Ossolińskich, 1987, 152p., In Polish, 12 refs.
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Natural resources, Ecology, Environmental protection, International cooperation, Research projects, Animals, Sea ice, Ocean currents.
The 1st section of this book is devoted to the natural environment and human activity, including sea ice, ocean currents, faunal adaptation, the H. Arctowski Station, politics and scientific activities, and environmental protection. The 2nd section deals with the adaptation and health of man in polar regions. An appendix to the 1st section includes a list of sites of special scientific interest, and the text of the Convention on the Conservation of Living Marine Resources of Antarctica.

46-325
Investigating Greenland's glaciers.
Weidick, A., *Denmark. Grönlands geologiske undersögelse. Rapport*, 1990, No.148, p.46-51, 17 refs.
Glacier surveys, Glacial hydrology, Glacier mass balance.

46-326
Greenland glaciers and the 'greenhouse effect'.
Braithwaite, R.J., *Denmark. Grönlands geologiske undersögelse. Rapport*, 1990, No.148, p.51-53, 10 refs.
Sea level, Glacier melting, Electric power.

46-327
Continued glaciological investigations with respect to hydropower and ice-climate relationships, at Pâkitsoq, Jakobshavn, West Greenland.
Thomsen, H.H., et al, *Denmark. Grönlands geologiske undersögelse. Rapport*, 1990, No.148, p.83-86, 16 refs.
Olesen, O.B.
Electric power, Glacier mass balance, Boreholes, Paleoclimatology.

46-328
Effects of glaciers on annual runoff east of Nuuk, Godthab, West Greenland.
Braithwaite, R.J., *Denmark. Grönlands geologiske undersögelse. Rapport*, 1990, No.148, p.87-91, 10 refs.
Runoff, Glacier ablation, Seasonal variations, Precipitation (meteorology).

46-329
Quaternary deposits on the coast of Eastern Chukotka. [Chetvertichnye otlozhenia poberezh'ia Vostochnoi Chukotki].
Ivanov, V.F., Vladivostok, DVNTs AN SSSR, 1986, 138p., In Russian. Refs. p.132-138.
Quaternary deposits, Shores, Glacial deposits, Plants (botany), Animals.

46-330
Problems in the study and protection of landscapes in northeastern USSR. [Problemy izucheniia okhrany landshaftov Severo-Vostoka SSSR].
Vas'kovskii, A.P., et al, Vladivostok, DVO AN SSSR, 1988, 170p., In Russian. Refs. p.162-170.
Volobueva, N.G., Zheleznov, N.K.
Ground ice, Ecology, Ecosystems, Podsol, Landscape types, Tundra.

46-331
United States arctic research policy: facing the arctic challenge.
Roederer, J.G., *Northern engineer*, Winter 1990, 22(4), p.15-20, 14 refs.
Research projects, Legislation.

46-332
Ice impact model tests for 3 bow forms of a vessel. Volume 2. Plotted time histories of the forces, moments, and motions.
Riska, K., et al, *Helsinki University of Technology. Faculty of Mechanical Engineering. Laboratory of Naval Architecture and Marine Engineering. Report*, 1990, M-96, 374p.
Kämäräinen, J., Hänninen, M.
Ice solid interface, Ice pressure, Ice models, Ships, Design, Ice edge.

46-333
Pleistocene glaciation, characteristics of sedimentation and reconstructions of drainage systems in the Koryakskiy Highlands. [Pleistotsenovye oledeneniia, osobennosti osadkonakopleniia i perestroek gidroseti v Koriakskom nagor'e].
Glushkova, O.IU., et al, Chetvertichnyi period Severo-Vostoka Azii; sbornik nauchnykh trudov (Quaternary period in northeastern Asia; collected scientific papers). Edited by V.P. Pokhialainen, Magadan, SVKNII DVO AN SSSR, 1987, p.33-54, In Russian, 17 refs.
Degtiarenko, IU.P., Prokhorova, T.P.
Pleistocene, Glaciation, Sedimentation, Drainage, Quaternary deposits.

46-334
Foam polymers in low temperature insulation. [Penopolimery v nizkotemperaturnoi izoliatsii].
Polunin, V.L., Moscow, Energoatomizdat, 1991, 191p., In Russian. 172 refs.
Polymers, Cellular plastics, Low temperature research, Thermal insulation, Analysis (mathematics).

46-335
Mercury content of antarctic ice and snow: further results.
Sheppard, D.S., et al, *Atmospheric environment*, 1991, 25A(8), p.1657-1660, 14 refs.
Patterson, J.E., McAdam, M.K.
Snow composition, Snow impurities, Chemical analysis, Polar regions, Antarctica - Victoria Land.
Surface and subsurface snow and ice samples from a remote site on the Antarctic Plateau near the Victoria Land Dry Valleys have been analyzed for mercury. Ultra-clean sampling techniques followed by on-site extraction and analysis gave a mean result of 0.96 pg/g for surface snows, and 0.4 pg/g for samples from the 4.6 m deep pit. The results confirm the indications of a previous study, that the mercury levels in antarctic snows are very much lower than those determined in other studies. (Auth.)

46-336
Direct determination of lead in Vostok antarctic ancient ice by laser excited atomic fluorescence spectrometry.
Boutron, C.F., et al, *Atmospheric environment*, 1990, 24A(6), p.1797-1800, 14 refs.
Ice composition, Isotope analysis, Chemical analysis, Ice cores, Lasers, Antarctica - Vostok Station.
Concentrations of lead (Pb) have been directly measured by laser-excited atomic fluorescence spectrometry down to pg/g level in six sections of the 2083 m Vostok deep antarctic ice core which had previously been mechanically decontaminated

Very small volumes of samples (20 microliters) were used, and there was no need for any preliminary chemical treatment or preconcentration step. The results are in very good agreement with those previously obtained for these core sections by isotope dilution mass spectrometry. (Auth.)

46-337

Development and testing of the MIT acoustic levitation test facilities.

Lupi, V.D., et al, *Journal of atmospheric and oceanic technology*, Aug. 1991, 8(4), p.541-552, 8 refs.
Hansman, R.J.
Cloud physics, Precipitation (meteorology), Test equipment, Sound waves, Laboratory techniques, Hailstone growth, Phase transformation, Wind tunnels, Design.

46-338

Case history: ice island drilling application and well consideration in Alaskan Beaufort Sea.

Angell, V.W., et al, *SPE drilling engineering*, Mar. 1991, 6(1), p.60-64, 2 refs.
Graham, H.J., Post, G.J.
Ice islands, Offshore drilling, Exploration, Artificial ice, Petroleum industry, Cold weather construction, Design criteria, Spray freezing, Beaufort Sea.

46-339

Method and equipment for measuring lateral flow in frozen soils.

Berman, D.I., et al, *Soviet soil science*, Sep. 1991, 23(3), p.77-80, Translated from Pochvovedenie, 1990, No.4. 6 refs.
Alfimov, A.V., Poploukhin, A.A.
Subpermafrost ground water, Ground thawing, Water flow, Flow measurement, Test equipment, Soil tests, Design.

46-340

Rigorous approach to polarimetric radar modeling of hydrometeor orientation distributions.

Vivekanandan, J., et al, *Journal of applied meteorology*, Aug. 1991, 30(8), p.1053-1063, 30 refs.
Adams, W.M., Bringi, V.N.
Precipitation (meteorology), Radar echoes, Particles, Scattering, Ice crystal optics, Orientation, Analysis (mathematics), Polarization (waves), Simulation.

46-341

Identification of rain and hail with circular polarization radar.

Al-Jumily, K.J., et al, *Journal of applied meteorology*, Aug. 1991, 30(8), p.1075-1087, 45 refs.
Charlton, R.B., Humphries, R.G.
Precipitation (meteorology), Radar echoes, Hail, Detection, Wave propagation, Storms, Rain, Weather forecasting, Polarization (waves), Accuracy.

46-342

Tussock tundra albedos on the North Slope of Alaska: effects of illumination, vegetation composition, and dust deposition.

Hope, A.S., et al, *Journal of applied meteorology*, Aug. 1991, 30(8), p.1200-1206, 13 refs.
Fleming, J.B., Stow, D.A., Aguado, E.
Tundra, Solar radiation, Albedo, Dust, Cloud cover, Environmental impact, Vegetation patterns, Plant ecology, Arctic landscapes.

46-343

Model evaluation of noninductive graupel-ice charging in the early electrification of a mountain thunderstorm.

Ziegler, C.L., et al, *Journal of geophysical research*, July 20, 1991, 96(D7), p.12,833-12,855, 39 refs.
MacGorman, D.R., Dye, J.E., Ray, P.S.
Cloud electrification, Snow pellets, Ice crystal collision, Thunderstorms, Polarization (charge separation), Air flow, Atmospheric electricity, Radar echoes, Mathematical models.

46-344

***Total ozone from the TIROS operational vertical* sounder during the formation of the 1987 "ozone hole".**

Lefèvre, F., et al, *Journal of geophysical research*, July 20, 1991, 96(D7), p.12,893-12,911, 36 refs.
Cariolle, D., Muller, S., Karcher, F.
Polar atmospheres, Decomposition, Ozone, Atmospheric density, Photochemical reactions, Sounding, Infrared mapping, Mathematical models, Radiance, Aerial surveys.

In this paper, total ozone maps obtained from the infrared radiances measured by the TOVS/HIRS2 instrument on board the NOAA 10 satellite are used to study the formation of the 1987 antarctic "ozone hole." In this study an improved version of the retrieval algorithm described by Muller and Cayla (1983) is used, with an approximate accuracy within 5-7% in clear sky conditions. Values determined from the TIROS operational vertical sounder (TOVS) are in good agreement with Dobson measurements in the mid-latitudes and with the ozonesondes launched from the antarctic stations during the Airborne Antarctic Ozone Experiment (AAOE). The agreement with the total ozone mapping spectrometer (TOMS) data at mid-latitudes is also good, but significant differences are found in early Sep. in the high latitudes. The ozone hole was already apparent in the TOMS map on the first days of Sep., while TOVS detected only localized ozone deep minima associated with optically thick polar stratosphere clouds (PSCs) and did not observe any circular depletion structure until Sep. 17. This discrepancy seems to be the consequence of high solar zenith angles and climatological errors in the TOMS algorithm, which tends to underestimate the ozone content in late winter. It is only in mid-Sep. that TOVS data show a rapid ozone decrease affecting the whole vortex. The low ozone amounts are first recorded in the vicinity of the PSCs detected in the ozone field and then spread into the vortex. TOVS observations suggest that a rapid ozone decrease might take place during or just after the formation of major water ice PSCs, which could be the direct consequence of both a sudden increase of free chlorine and an efficient denitrification occurring during type 2 PSC events. It is concluded that since the algorithm presented in this paper allows reliable ozone determinations in middle and high latitudes and accurate type 2 PSC detection, measurements from TOVS could play an important role in the ozone layer monitoring, especially in the wintertime polar regions where UV techniques are ineffective or affected by the lack of intense sunlight. (Auth. mod.)

46-345

Particle size distributions in polar mesospheric clouds derived from Polar Mesosphere Explorer measurements.

Rusch, D.W., et al, *Journal of geophysical research*, July 20, 1991, 96(D7), p.12,933-12,939, 25 refs.
Thomas, G.E., Jensen, E.J.
Polar atmospheres, Cloud physics, Radiometry, Ice crystal optics, Particle size distribution, Scattering, Spectra, Brightness, Aerial surveys.

46-346

Polar stratospheric cloud observations over the Antarctic continent at Dumont d'Urville.

Stefanutti, L., et al, *Journal of geophysical research*, July 20, 1991, 96(D7), p.12,975-12,987, 12 refs.
Polar atmospheres, Lidar, Cloud physics, Aerosols, Backscattering, Stratosphere, Antarctica—Dumont d'Urville Station.

The Istituto di Ricerca sulle Onde Electromagnetiche (IROE) two-channel elastic backscattering lidar, suitable for depolarization measurements, has been operated since Jan. 8, 1989, at the French antarctic base of Dumont d'Urville. A continuous monitoring of the stratosphere was performed, which permitted measurement of the evolution of the background stratospheric aerosols and of polar stratospheric clouds (PSC) throughout the year. The data reported in this article correspond to the first year of measurements. Depolarization of the lidar signals was measured in order to obtain information on the type of clouds observed and on their particle size distribution. Both low (<10%) and high (>10%) depolarization ratios were detected, permitting discrimination between PSC types according to the classification given by Toon et al. (1990). Temporal continuity and high time resolution of the lidar measurements are evidence for altitude decreases in the PSC layers over periods of a few hours. These motions, if linked to sedimentation processes, led to values of velocity (about 10 cm/s) compatible with large particles. (Auth. mod.)

46-347

Crystal clouds in the Martian atmosphere.

Lee, P., et al, *Astronomy and astrophysics*, Dec. 1990(II), 240(2), p.520-532, 49 refs.
Ebisawa, S., Dollfus, A.
Mars (planet), Extraterrestrial ice, Atmospheric composition, Cloud physics, Imaging, Ice crystal growth, Water vapor, Sublimation, Polarization (charge separation), Planetary environments.

46-348

Two considerations concerning the free molecular flow of gases in porous ices.

Steiner, G., *Astronomy and astrophysics*, Dec. 1990(II), 240(2), p.533-536, 11 refs.
Ice air interface, Air flow, Vapor diffusion, Porous materials, Extraterrestrial ice, Analysis (mathematics), Mass flow, Vapor pressure.

46-349

Strength development of concrete cured at low temperature.

Korhonen, C.J., et al, MP 2950, Corps of Engineers Structural Engineering Conference, Jacksonville, FL, July 8-12, 1991, Washington, D.C., Directorate of Engineering and Construction, 1991, p.1-9, 7 refs.
Cortez, E.R., Charest, B.A.
Concrete curing, Winter concreting, Concrete admixtures, Concrete strength.

Long winters, emergency repairs, or simply a tight schedule may force an engineer to look for ways to cast concrete for structural applications during cold weather. Under adverse conditions such as these, concreting has almost always entailed expensive and time-consuming methods of protecting the fresh concrete from freezing temperatures. A newer approach is the use of chemical admixtures that depress the freezing point of water and allow concrete to gain strength at temperatures that are damaging to normal concrete. This paper discusses a study of a series of chemicals that were tested for their effect on strength gain in concrete cured at various low temperatures. The results show that appreciable strength can be promoted in concrete cured at temperatures below freezing when these chemicals are used.

46-350

Proceedings. Merging of theory and practice.

International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990, Bigfork, MT, ISSW '90 Committee, [1990], 337p., Refs. passim. For selected papers see 46-351 through 46-377.
Avalanche forecasting, Avalanche triggering, Avalanche mechanics, Snow cover stability, Snow surveys, Snow loads, Avalanche formation, Avalanche modeling, Avalanche engineering.

46-351

Seasonal snowcover in the foothills of Alaska's Arctic Slope.

Liston, G.E., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings, Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.1-9, 17 refs.
Snow cover distribution, Snow surveys, Snowmelt, Seasonal variations, Snow water equivalent, United States—Alaska—North Slope.

46-352

Comparison of the digital resistograph with the ram penetrometer.

Brown, R.L., et al, International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.19-30, 4 refs.
Birkeland, K.
Snow strength, Snow cover stability, Snow survey tools, Measuring instruments, Probes, Penetrometers, Data processing.

46-353

Operational use of the model Crocus by French avalanche forecast services.

Brun, E., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.31-37.
Avalanche forecasting, Snow cover stability, Mathematical models, Snow surveys.

46-354

Applications of SNOTEL data in formulating the South-Central Montana Avalanche Advisory.

Fike, R., et al, International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.39-48, 10 refs.
Pedersen, V., Beard, G., Farnes, P.
Avalanche forecasting, Snow surveys, Snow loads, Meteorological data, Safety, United States—Montana.

46-355

Computerized system designed for local avalanche hazard forecasting in Tignes, Savoie, France.

Garreaud, E., et al, International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.49-62, 7 refs.
Navillod, L., Schniewind, H.
Avalanche forecasting, Snow surveys, Computer applications, Safety, Meteorological data.

46-356

Prediction of snowfall and two network systems of snow information at Toyama Prefecture and along the National Highway No. 17 from Niigata to Tokyo through Japan Alps.

Nakamura, T., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.63-72, 4 refs.
Snowfall, Weather forecasting, Road maintenance, Japan.

46-357

Effects of forests near timberline on avalanche formation.

Gubler, H., et al, International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.73-92, 17 refs.
Rychetnik, J.
Avalanche formation, Forest lines, Vegetation factors, Forest strips, Snow cover stability.

46-358
Snow gliding on steep rock, Coquihalla, B.C.
McClung, D.M., et al, International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.93-94, 1 ref.
Bennetto, J.D., Walker, S., Golley, W.
Snow slides, Avalanche formation, Snow cover stability.

46-359
Differential heat transfer—its effects on avalanche release in the mountain snowpack.
Logan, N., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.95-96.
Avalanche triggering, Snow cover stability, Temperature effects.

46-360
Military weapons for avalanche control program.
Abromeit, D., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.167-174, 1 ref.
Avalanche triggering, Explosives, Blasting, Military equipment.

46-361
Statistical analysis of the effectiveness of air blasts and surface blasts in producing avalanches.
Austiguy, G., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.175-183, 2 refs.
Avalanche triggering, Explosives, Blasting.

46-362
Evolution of air blasting techniques for avalanche control at Bridger Bowl Ski Area, Bozeman, Montana.
Dombroski, R., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.185-191, 4 refs.
Avalanche triggering, Explosives, Blasting.

46-363
Use of large explosive charges for avalanche hazard reduction.
Livingood, L., et al, International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.192-197.
Kanzler, J., Elkins, J.
Avalanche triggering, Explosives, Blasting.

46-364
Avalanche rescue: frequency variation as a search methodology.
Calomeni, D.A., et al, International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.211-217.
Rogers, J.C.
Avalanches, Rescue operations.

46-365
Snow avalanche dynamics as a granular fluid phenomenon.
Dent, J.D., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.227-233, 7 refs.
Avalanche mechanics, Avalanche modeling, Fluid flow.

46-366
Width of unconfined slab avalanches based on field measurements of slab properties.
Jamieson, J.B., et al, International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.234-244, 14 refs.
Johnston, C.D.
Avalanche formation, Avalanche mechanics, Avalanche modeling, Mathematical models, Snow mechanics, Snow cover stability.

46-367
Maximum avalanche runout mapping; a case study *from the central Sierra Nevada.*
Frutiger, H., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.245-251, 11 refs.
Avalanches, Avalanche tracks, Avalanche forecasting, United States—California—Sierra Nevada.

46-368
Snow creep pressure on mast constructions.
Larsen, J.O., et al, International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.252-256, 4 refs.
Laugesen, J.
Power line supports, Snow loads, Snow creep.

46-369
Measurements of avalanche loads, East Riverside avalanche shed, Colorado.
Mears, A.I., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.257-260, 1 ref.
Avalanche mechanics, Snow loads, Avalanche engineering, Snowsheds.

46-370
Variability of liquid water content in an alpine snowpack.
Kattelmann, R.C., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.261-265, 12 refs.
Snow water content, Snow surveys.

46-371
Snow transportation by Eolian effect (snowdrift): experimental field in Pala di Santa (Pampeago) Trento, Italy.
Caola, E., et al, International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.266-290.
Betti, V.
Snowdrifts, Avalanche engineering, Snow loads, Snow retention, Mathematical models.

46-372
Avalanche protection and avalanche research in Austria.
Höller, P., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.291-296, 9 refs.
Avalanche engineering, Research projects, Austria.

46-373
New sensor for snow wetness monitoring.
Denoth, A., et al, International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.297-301, 1 ref.
Griessmair, W.
Snow water content, Snow samplers, Snow electrical properties, Measuring instruments.

46-374
Quick growth of depth hoar in a surface layer.
Fukuzawa, T., et al, International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.303-306, 6 refs.
Akitaya, E.
Depth hoar, Metamorphism (snow), Snow crystal growth, Snow stratigraphy, Snow cover stability.

46-375
Dry slab avalanches triggered by skiers.
Schweizer, J., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.307-309, 7 refs.
Avalanche triggering, Avalanche mechanics.

46-376
Using CAD for development of avalanche control explosive delivery systems.
Thompson, S.C., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.310-315
Avalanche triggering, Explosives, Computer applications.

46-377
New blasting device: the GAZEX.
Borrel, G., International Snow Science Workshop, Bigfork, Montana, Oct. 9-13, 1990. Proceedings. Merging of theory and practice, Bigfork, MT, ISSW '90 Committee, [1990], p.316.
Avalanche triggering, Explosives, Blasting.

46-378
State of balance of the cryosphere.
Van der Veen, C.J., *Reviews of geophysics*, Aug. 1991, 29(3), p.433-455, Refs. p.453-455.
Ice sheets, Glacier ice, Mass balance.
The current state of balance of the terrestrial ice sheets and glaciers is poorly known. What little data are available suggest that, worldwide, mountain glaciers have receded since about the mid-nineteenth century, with occasional interruptions of the retreat. The interior part of the Greenland ice sheet appears to be thickening or in near equilibrium, but this ice sheet may be thinning in the coastal areas. Estimates of the mass balance of the antarctic ice sheet suggest that it is positive, although the error limits allow for a slightly negative balance. There is an urgent need to greatly improve the current estimates and to monitor the ice sheets continuously for changes in volume and extent. A program based on satellite observation techniques, in cooperation with ground-based surveys repeated over long time periods (many years or decades), appears to be most opportune to achieve this. (Auth.)

46-379
Design of piles in permafrost under combined lateral and axial load.
Foriero, A., et al, *Journal of cold regions engineering*, Sep. 1991, 5(3), p.89-105, 22 refs.
Ladanyi, B.
Frozen ground mechanics, Piles, Permafrost beneath structures, Ultimate strength, Stability, Loading, Design criteria, Deformation, Analysis (mathematics), Creep.

46-380
Reduction of ice thickness on northern water reservoirs.
Stanley, S.J., et al, *Journal of cold regions engineering*, Sep. 1991, 5(3), p.106-124, 15 refs.
Smith, D.W.
Reservoirs, Ice cover thickness, Ice growth, Ice control, Water supply, Water storage, Snow cover effect, Slush, Design, Ice deterioration.

46-381
Reliability analysis of thaw-induced pore pressures.
Banerjee, S., et al, *Journal of cold regions engineering*, Sep. 1991, 5(3), p.125-141, 15 refs.
Datta, B.
Ground thawing, Soil strength, Frozen ground expansion, Soil water migration, Water pressure, Thaw consolidation, Forecasting, Settlement (structural), Analysis (mathematics), Design criteria.

46-382
Thaw response of tussock-shrub tundra to experimental all-terrain vehicle disturbances in south-central Alaska.
Racine, C.H., et al, *Arctic*, Mar. 1991, 44(1), MP 2952, p.31-37, With French summary. 12 refs.
Ahlstrand, G.M.
Tundra, Loading, All terrain vehicles, Bearing strength, Ground thawing, Thaw depth, Environmental impact, Mechanical tests, Subsurface investigations.
A perennial snowbank located in the continuous permafrost zone was cored to obtain details of its internal structure and history. In spring the snowbank is up to 10 m thick and composed of deep snow accumulated during the previous winter, overlying ice developed by basal ice accretion over many years. The perennial ice exhibits a layered structure with alternating clear and milky bands, and contains randomly oriented, variably shaped bubbles. Horizons of aeolian and mudflow deposits occur at irregular intervals and correspond to periods of aggradation and thaw truncation of the snowbank. Tritium concentrations in a core from the deepest portion of the snowbank indicate that the basal 2 m of ice pre-dates 1957. Other layers of ice likely represent precipitation that fell between 1958 and 1962, between 1968 and 1976, and after 1983. Ice developed during the 1963 atmospheric tritium peak is no longer present. Energy balance measurements indicate that potential climatic warming is unlikely to eliminate the perennial portion of the snowbank unless accompanied by substantially less snow drifting at the site.

46-383
Recovery of tundra vegetation after overgrazing by caribou in arctic Canada.
Henry, G.H.R., et al, *Arctic*, Mar. 1991, 44(1), p.38-42, With French summary. 15 refs.
Gunn, A.
Tundra, Animals, Damage, Environmental impact, Biomass, Vegetation patterns, Arctic landscapes, Plant ecology.

46-384
Internal structure and environmental significance of a perennial snowbank, Melville Island, N.W.T.
Lewkowicz, A.G., et al, *Arctic*, Mar. 1991, 44(1), p.74-82, With French summary. 34 refs.
Harry, D.G.
Snow cover stability, Continuous permafrost, Snow cover structure, Snow cover effect, Drill core analysis, Environmental impact, Climatic changes, Chemical composition, Global warming, Snow morphology.

46-385
Evidence of density currents with potential to promote meromixis in ice-covered saline lakes.
Ferris, J.M., et al. *Palaeogeography, palaeoclimatology, palaeoecology*, May 15, 1991, 81(1-4), p.99-107, 33 refs.
Gibson, J.A.E., Burton, H.R.
Salt lakes, Ice cover, Convection, Water flow, Antarctica—Vestfold Hills.
In the Vestfold Hills' saline lakes, progressive growth of ice volume through the austral winter and spring months generates haline convection capable of mixing the water column to a depth at least as great as that achieved by wind-induced turbulence in the summer ice-free period. Further, cold and very saline brines may form at the shallow periphery of a lake and flow downslope, penetrating to the lake center below the convectively mixed layer. Detailed temperature profiles of hypersaline Organic Lake provide the first evidence for these density currents in saline lakes of the Vestfold Hills. These data indicate a dynamic response to periods of relatively cold weather, and that the resulting density currents may be sufficiently small in volume to have little effect on the anoxia of bottom layers in these meromictic lakes. Alternating periods of negative and positive water balance may also be significant in the formation and destruction of meromixis in these saline lakes, which lack outflow streams. If a lake has been through a period of negative water balance, becoming more saline, and then begins to be diluted during a subsequent period of positive water balance, the winter haline convection will penetrate to progressively shallower depths, and deeper layers may stagnate, marking the onset of meromixis. An increase in the water level of Organic Lake over ten years indicates the speed with which the Vestfold Hills' lakes may experience significant change in salinity, despite the generally small catchments of these lakes. (Auth.)

46-386
Comprehensive geocryological investigations of Chukotka. [Kompleksnye geokriologicheskie issledovaniia Chukotki].
Tishin, M.I., ed. Magadan, SEKNII DVO AN SSSR, 1991, 148p., In Russian. For individual papers see 46-387 through 46-403.
Geocryology, Lithology, Ice composition, Tundra, Frozen ground temperature, Foundations, Ice wedges, Permafrost, Rheology, Thermokarst.

46-387
Cryolithological composition of the ice complex at the Anadyr' River estuary. [Kriolitologicheskoe stroenie ledovogo kompleksa v ust'e r.Anadyr'].
Kotov, A.N., Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.5-18, In Russian. 10 refs.
Geocryology, Lithology, Estuaries, Ice composition, USSR—Anadyr' River.

46-388
Characteristics of the anomalies in the supergene geochemical field in the cryolithozone of Chukotka. [Osobennosti anomalii gipergennogo geokhimicheskogo polia kriolitozony Chukotki].
Kononov, V.A., Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.18-39, In Russian. 20 refs.
Geocryology, Lithology, Minerals, Geochemistry, Tundra, Landscape types.

46-389
Chemical composition of ice wedges in Chukotka. [Khimicheskii sostav povtorno-zhil'nykh l'dov Chukotki].
Kotov, A.N., et al. Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.39-48, In Russian. 7 refs.
Brazhnik, S.N.
Ice wedges, Ice composition.

46-390
Formation of the chemical composition of permafrost deposits (in the example of the southern Lower Anadyr' basin). [Formirovanie khimicheskogo sostava mnogoletnemerzlykh otlozhenii (na primere iuga Nizhne-Anadyrskoi vpadiny)].
Brazhnik, S.N., Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.48-54, In Russian. 7 refs.
Ice composition, Permafrost structure, River basins.

46-391
Developing unified principles of geocryological zoning. [K razrabotke edinykh printsipov geokriologicheskogo raionirovaniia].
Stepanov, R.V., Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.54-61, In Russian. 8 refs.
Geocryology, Mapping.

46-392
Estimating the degree of disturbance to geocryological and ecological conditions from the discharge of water from thermokarst in Chukotka. [Otsenka stepeni narushenii geokriologicheskikh i ekologicheskikh uslovii pri zalpovykh sbrosakh vody iz termokarstovykh ozer Chukotki].
Krivoshchekov, V.S., Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.61-73, In Russian. 4 refs.
Geocryology, Ecology, Thermokarst lakes, Analysis (mathematics).

46-393
New basic criteria in prospecting for gold-silver mineralization in Chukotka. [Novye poiskovye kriterii pri razvedke zoloto-serebrianogo orudeneniia na Chukotke].
Grechishnikov, A.V., Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.73-80, In Russian. 22 refs.
Geocryology, Gold, Exploration.

46-394
Effectiveness of agricultural development of gently sloping tundra embankments. [Effektivnost' sel'skokhoziaistvennogo osvoeniia pologikh tundrovykh sklonov].
Krivoshchekov, V.S., et al. Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.80-88, In Russian.
Sopov, V.V.
Tundra, Geocryology, Agriculture, Embankments, Economic development, Analysis (mathematics).

46-395
***Experiment using electric geophysical exploration in* a cryological survey of the territory of the Upper Telekay deposit.** [Opyt ispol'zovaniia elektrorazvedki pri merzlotnoi s"emke na territorii Verkhne-Telekaiskogo mestorozhdeniia].
Maslov, V.IA., Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.89-94, In Russian. 5 refs.
Geocryology, Tundra, Geophysical surveys.

46-396
Some characteristics of the snow cover in the southern part of the Lower Anadyr' Lowlands. [Nekotorye osobennosti snezhnogo pokrova iuzhnoi chasti Nizhne-Anadyrskoi Nizmennosti].
Maslov, V.IA., et al. Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.94-101, In Russian.
Maslova, G.L.
Snow cover, Snow depth, Snow temperature, Snow hardness, Snow cover structure.

46-397
Cryological-hydrogeological regionalization of the territory around the city of Anadyr'. [Merzlotno-gidrogeologicheskoe raionirovanie territorii g.Anadyr'].
Stepanov, R.V., et al. Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.101-110, In Russian. 3 refs.
Stepanova, I.V.
Geocryology, Hydrogeology, Engineering geology.

46-398
Forecasting the thermal regime of building foundations in the city of Anadyr', derived according to the 2nd principle. [Prognoz temperaturnogo rezhima osnovaniia zdanii v g.Anadyr', vozvodimykh po II printsipu].
Stepanova, I.V., et al. Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.110-114, In Russian. 2 refs.
Malakhova, G.E.
Forecasting, Thermal regime, Foundations, Mathematical models, Permafrost beneath structures.

46-399
Calculating the parameters of a cooling contour according to the results of routine observations of ground temperatures in the city of Anadyr'. [Raschet parametrov okhlazhdaiushchego kontura po rezul'tatam rezhimnykh nabliudenii za temperaturami gruntov v g.Anadyr'].
Stepanov, R.V., et al. Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.114-117, In Russian. 2 refs.
Malakhova, G.E.
Heat transfer, Frozen ground temperature, Frozen ground thermodynamics, Analysis (mathematics).

46-400
Changes in the geocryological conditions during the process of constructing the hydroelectrical center in the Anadyr' thermoelectric power plant. [Izmerenie geokriologicheskikh uslovii v protsesse stroitel'stva gidrouzla Anadyrskoi TETs].
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Geocryology, Electric power, Frozen ground temperature.

46-401
Deformation features of melting, coarse detrital soils in the foundation of a planned dam on the Ponneurgen River. [Deformatsionnye svoistva ottaivaiushchikh krupnooblomochnykh gruntov osnovaniia proektiruemoi plotiny na r.Ponneurgen].
Kazakov, V.IU., et al. Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.123-126, In Russian.
Koshel', G.G., Kuril'chik, A.F.
Rheology, Foundations, Dams, Geocryology, Ground thawing.

46-402
Calculating the parameters of thermistors on a DVK-3 type micro-IBM. [Raschet parametrov termorezistorov na mikro-EBM tipa DVK-3].
Gunbin, D.V., Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.127-130, In Russian. 3 refs.
Thermistors, Geocryology, Computer applications.

46-403
Regional characteristics of lacustrine thermokarst in northern Chukotka. [Regional'nye osobennosti ozernogo termokarsta severa Chukotki].
Tishin, M.I., Kompleksnye geokriologicheskie issledovaniia Chukotki (Comprehensive geocryological investigations of Chukotka). Edited by M.I. Tishin, Magadan, SEKNII DVO AN SSSR, 1991, p.130-147, In Russian. 7 refs.
Lacustrine deposits, Thermokarst development.

46-404
Dynamics of thawing permafrost rocks for mining excavations.
Izakson, V.IU., et al. *Soviet mining science*, Jan. 1988, 23(2), p.105-110, Translated from Fiziko-tekhnicheskie problemy razrabotki poleznykh iskopaemykh, 1987, No.2. 8 refs.
Petrov, E.E.
Mining, Rock excavation, Ground thawing, Permafrost bases, Thaw depth, Air temperature, Computerized simulation, Frozen rock temperature.

46-405
Preconditioning of deep snowpack for off-road vehicle mobility.
Boonsinsuk, P., et al. *Journal of terramechanics*, 1989, 26(1), p.83-100. With French and German summaries. 6 refs.
Irwin, G.J., Yong, R.N., Caporuscio, F.
Snow cover stability, Cold weather construction, Tracked vehicles, Loading, Snow roads, Trafficability, Bearing strength, Snow compression, Mechanical tests, Admixtures, Snow surface.

46-406
Arctic news-record—Polar bulletin, Vol.7, No.2.
Wade, N., ed. Oslo, Norway, Scanews, 1991. 8p.
Ocean environments, Petroleum industry, Offshore drilling, Cold weather operation, Oceanography.

46-407
Do the anomalous fluctuations of Sólheimajökull reflect ice-divide migration.
Dugmore, A.J., et al. *Boreas*, June 1, 1991, 20(2), p.105-113, 37 refs.
Sugden, D.E.
Glacier oscillation, Glacial geology, Paleoclimatology, Climatic changes, Topographic effects, Landforms, Bedrock, Iceland.

46-408
Effect of multipath and snow on millimeter wave scintillations on a 4.1-km line-of-sight link.
Sarma, A.D., et al. *Journal of atmospheric and terrestrial physics*, May 1991, 53(5), p.369-378, 25 refs.
Cole, R.S.
Radio waves, Telecommunication, Wave propagation, Falling snow, Attenuation, Reflectivity, Meteorological factors.

46-409
Decrease in anthropogenic lead, cadmium and zinc in Greenland snows since the late 1960s.
Boutron, C.F., et al. *Nature*, Sep. 12, 1991, 353(6340), p.153-156. 27 refs.
Goriach, U., Candelone, J.P., Bolshov, M.A., Delmas, R.J.
Snow impurities, Minerals, Greenland.

46-410
Antarctic sea ice variations and seasonal air temperature relationships.
Weatherly, J.W., et al. *Journal of geophysical research*, Aug. 15, 1991, 96(C8), p.15,119-15,130, 14 refs.
Walsh, J.E., Zwally, H.J.
Sea ice distribution, Air temperature, Air ice water interaction, Seasonal variations.
Monthly antarctic station temperatures are used in conjunction with grids of sea ice coverage in order to evaluate the temporal trends and the strength of associations between the two variables at lags of up to several seasons. Over the 30-year period 1958-1987 the trends of temperature are positive in all seasons. However, for the 15 years (1973-1987) for which ice data are available, the trends of temperature are predominantly positive only in winter and summer. The trends are most strongly positive over the Antarctic Peninsula. The spatially aggregated trend of temperature for this latter period is small but positive, while the corresponding trend of ice coverage is small but negative. Regional trends of both variables are larger. Cross correlations between concurrent anomalies of the two variables are negative over most of the continent and are strongest over the Antarctic Peninsula, especially in winter. Lag correlations between seasonal anomalies of the two variables are generally stronger, with ice lagging the summer temperatures and with ice leading the winter temperatures. The implication is that summer temperatures predispose the near-surface waters to above- or below-normal ice coverage in the following autumn and winter. The conclusions show little dependence on the choice of the sea ice data source or of the measure of sea ice (extent or areal coverage), but they do depend considerably on the method by which the data are geographically aggregated. (Auth.)

46-411
Transport of anthropogenic carbon dioxide into the Weddell Sea.
Anderson, L.G., et al. *Journal of geophysical research*, Sep. 15, 1991, 96(C9), p.16,679-16,687, 21 refs.
Holby, O., Lindegren, R., Ohlson, M.
Sea water freezing, Carbon dioxide, Air water interactions, Ocean currents, Ice shelves, Water chemistry, Sampling, Oceanographic surveys, Antarctica - Weddell Sea.
Total carbonate data from the southern Weddell Sea, collected during the Swedish Antarctic Expedition in 1988-1989, has been investigated with respect to its content of anthropogenic carbon dioxide. The measured data was corrected for decay of organic matter by the use of the apparent oxygen utilization and the ratio of carbon to oxygen in organic matter. Correction due to precipitation or dissolution of metal carbonate was not found to be necessary from alkalinity and calcium data. With a combination of the water mass mixing conditions and the atmosphere-ocean carbon dioxide exchange, the anthropogenic input of carbon dioxide has been estimated. The anthropogenic carbon dioxide mean concentration varies in the different water masses as a result of the mixing conditions, from about 36 micro mol/kg in the Ice Shelf Water to 8 micro mol/kg in the Antarctic Bottom Water. The data were combined with oceanographic information in order to elucidate the ventilation of carbon dioxide in the Weddell Sea. With the outflow of Ice Shelf Water from the Filchner Depression equal to 700,000 cu m/s, the annual transport of anthropogenic carbon amounts to 8 trillion g for this special area. There are indications of other areas with significant deep water formation, but it is unlikely for these to add more than 2 times that of the Filchner Depression. This results in a total sequestering in the Weddell Sea of less than 1% of the annual anthropogenic emission of about 5.5 Gt C. (Auth. mod.)

46-412
Statistical description of the microstructure of young sea ice.
Perovich, D.K., et al. *Journal of geophysical research*, Sep. 15, 1991, 96(C9), MP 2953, p.16,943-16,953, 23 refs.
Gow, A.J.
Sea ice, Young ice, Ice microstructure, Ice crystal optics, Microwaves, Ice models, Statistical analysis, Image processing, Salinity, Correlation, Radiometry.
In order to fully exploit microwave models of sea ice, the standard ice characterization must be supplemented by a statistical description of the ice microstructure. For the strong fluctuation theory this statistical description takes the form of the mean and variance of the permittivity plus correlation lengths. In this paper, we have computed these statistics for over 50 samples of young ice, including both columnar congelation ice and desalinated bubbly ice, which were taken from different vertical depths and horizontal positions within the ice sheet and encompassed a comprehensive range of ice temperatures and brine volumes. For each of these samples, horizontal thin sections were photographed, then digitized and analyzed on a personal computer-based image processing system. Results indicate that correlation lengths correspond to the physical dimensions of the inclusions.

46-413
Development of a coupled ice-ocean model for forecasting ice conditions in the Arctic.
Riedlinger, S.H., et al. *Journal of geophysical research*, Sep. 15, 1991, 96(C9), p.16,955-16,977, 24 refs.
Preller, R.H.
Sea ice distribution, Ice models, Ice water interface, Ice conditions, Ice forecasting, Ice cover thickness, Ice edge, Drift.

46-414
Correlation of nearshore ice movement with seabed ice gouges near Barrow, Alaska.
Shapiro, L.H., et al. *Journal of geophysical research*, Sep. 15, 1991, 96(C9), p.16,979-16,989, 17 refs.
Barnes, P.W.
Sea ice distribution, Drift, Ice scoring, Radar tracking, Bottom topography, Ice conditions, Seasonal variations, Orientation, Sounding, Correlation.

46-415
Radiative transfer model for sea ice with vertical structure variations.
Grenfell, T.C., *Journal of geophysical research*, Sep. 15, 1991, 96(C9), p.16,991-17,001, 33 refs.
Sea ice, Ice models, Remote sensing, Snow cover effect, Optical properties, Albedo, Solar radiation, Radiation absorption, Scattering, Analysis (mathematics), Vegetation factors.

46-416
Problems in soil mechanics and engineering geocryology; collected scientific papers. [Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov].
Zaretskiĭ, IU.K., ed. Moscow, Stroĭizdat, 1990. 265p. In Russian with English introduction and table of contents. For selected papers see 46-417 through 46-436.
Engineering geology, Permafrost beneath structures, Geocryology, Soil mechanics, Frozen ground mechanics, Design, Foundations, Ice deformation, Rheology, Frozen ground strength, Mathematical models, Analysis (mathematics), Frost heave, Temperature effects, Aircraft landing areas, Ice creep.

46-417
Directions in the development of frozen soil mechanics. [Puti razvitiia mekhaniki merzlykh gruntov].
Vialov, S.S., Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.8-16. In Russian. 21 refs.
Soil mechanics, Frozen ground mechanics, Research projects.

46-418
Deformation and failure of ice as an anisotropic body. [Deformirovanie i razrushenie l'da kak anizotropnogo tela].
Vialov, S.S., et al. Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.16-24. In Russian.
Maksimiak, R.V., Razbegin, V.N.
Ice deformation, Ice mechanics, Anisotropy, Mathematical models.

46-419
Estimating the limiting long-term shear resistance of frozen ground. [K otsenke predel'no dlitel'nogo soprotivleniia merzlogo grunta sdvigu po materialu].
Gerasimov, A.S., Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.39-48. In Russian. 11 refs.
Frozen ground mechanics, Rheology, Frozen ground strength, Analysis (mathematics).

46-420
Creep of saline ice under complex stresses. [Polzuchest' solenovodnogo l'da pri slozhnom napriazhennom sostoianii].
Golubov, A.I., et al. Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.49-57. In Russian. 7 refs.
Razbegin, V.N., Slepak, M.E.
Salt ice, Ice creep, Analysis (mathematics), Mathematical models.

46-421
Development of certain cryogenic physical-geological processes in the foundations of northern airfields. [Razvitie nekotorykh kriogennykh fiziko-geologicheskikh protsessov v osnovaniiakh severnykh aerodromov].
Grechishchev, S.E., et al. Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.57-65. In Russian. 2 refs.
Sheshin, IU.B.
Foundations, Deformation, Geocryology, Soil freezing, Aircraft landing areas, Analysis (mathematics).

46-422
Modeling thermoplastic deformation of frozen ground during thawing around an excavation. [Modelirovanie termoplasticheskogo deformirovaniia merzlykh porod pri protaivanii vokrug vyrabotok].
Dubina, M.M., et al. Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.76-82. In Russian. 8 refs.
Cherniakov, IU.A.
Mathematical models, Frozen ground mechanics, Ground thawing, Rheology.

46-423
Chemogenic heaving of frozen rocks. [Khemogennoe puchenie merzlykh porod].
Ershov, E.D., et al. Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.83-96. In Russian.
Lebedenko, IU.P.
Frozen rocks, Frost heave.

46-424
All-weather airfield covering. [Vsepogodnye aerodromnye pokrytiia].
Ivanov, V.N., Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.106-116. In Russian.
Covering, Snow cover effect, Aircraft landing areas, Analysis (mathematics).

46-425
Quantitative approximation of the dependence of frozen ground strength on temperature and time. [Kolichestvennye approksimatsii zavisimosti prochnosti merzlogo grunta ot temperatury i vremeni],
Konovalov, A.A., Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.117-126, In Russian. 10 refs.
Frozen ground strength, Temperature effects Time factor, Analysis (mathematics).

46-426
Reliability of dams in the Far North and permafrost regions. [Nadezhnost' plotin v raĭonakh Kraĭnego Severa i vechnomerzlykh gruntov],
Kronik, IA.A., Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.131-143, In Russian. 7 refs.
Dams, Permafrost beneath structures, Analysis (mathematics).

46-427
Foundations of consolidated frozen ground. [Fundamenty iz uprochnennogo merzlogo grunta],
Kutvitskaia, N.B., Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.149-155, In Russian.
Foundations, Frozen ground mechanics.

46-428
Certain rheological characteristics of frozen soil. [O nekotorykh znacheniiakh reologicheskikh kharakteristik merzlogo grunta],
Lunev, M.V., Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers) Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.155-157, In Russian. 3 refs.
Rheology, Frozen ground mechanics, Analysis (mathematics).

46-429
Behavior of piles installed into locally thawed ground during their period of operation. [Povedenie svaĭ, pogruzhaemykh v lokal'no ottaiannye grunty, v ekspluatatsionnyĭ period],
Minkin, M.A., et al, Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.165-172, In Russian. 2 refs.
Sheĭnkman, D.R.
Piles, Loads (forces), Pile load tests, Frozen ground mechanics, Freeze thaw cycles, Ground thawing, Analysis (mathematics).

46-430
Determining the parameters of a set of similar creep curves of frozen ground using the least squares method. [Opredelenie parametrov semeĭstva podobnykh krivykh polzuchesti merzlykh gruntov metodom naimen'shikh kvadratov],
Mirenburg, IU.S., Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.172-177, In Russian. 1 ref.
Frozen ground mechanics, Analysis (mathematics), Rheology, Soil creep.

46-431
Principles for designing foundations on frost-heaving soils. [Printsipy rascheta fundamentov na puchinistykh gruntakh],
Orlov, V.O., Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.187-198, In Russian. 2 refs.
Foundations, Analysis (mathematics), Frost heave, Frozen ground mechanics, Design.

46-432
Forecasting long-term strength of frozen peat soils. [Prognoz dlitel'noĭ prochnosti merzlykh torfianykh gruntov],
Roman, L.T., Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.198-211, In Russian. 7 refs.
Long range forecasting, Frozen ground strength, Peat, Analysis (mathematics).

46-433
Designing foundations for plastic frozen bases. [Raschet fundamentov na plastichno-merzlykh osnovaniiakh],
Slepak, M.E., Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.211-217, In Russian. 9 refs.
Foundations, Design, Analysis (mathematics), Frozen ground strength, Frozen ground mechanics.

46-434
Artificial ice-ground and ice islands for drilling boreholes in the shelf of arctic seas. [Iskusstvennye ledogruntovye i ledovye ostrova dlia bureniia skvazhin na shel'fe arkticheskikh morei],
Khrustalev, L.N., et al, Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.249-252, In Russian.
Gorodetskiĭ, S.E.
Ice islands, Artificial islands, Drilling, Boreholes.

46-435
Testing of antarctic ice with stamps. [Ispytaniia antarkticheskogo l'da shtampami],
Chumichev, B.D., et al, Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.252-257, In Russian. 2 refs.
Gorodetskiĭ, S.E.
Glacier ice, Ice deformation, Ice mechanics, Loads (forces), Ice temperature.
Testing of natural glacier ice was conducted at the Molodezhnaya Station for the purpose of studying the interrelationship between ice stresses and deformation in order to base construction projects on and in the ice, to control load resting on the ice surface, and to resolve other engineering questions. Graphs and data show the development of the settling of a stamp under 1 deg of loading and unloading, and at various temperatures and pressures. (Auth. mod.)

46-436
Designing ice-ground barriers used for sinking deep mine shafts, based on rheological characteristics of the frozen ground. [Raschet ledogruntovykh ograzhdeniĭ, primeniaemykh pri prokhodke glubokikh shakhtnykh stvolov, s uchetom reologicheskikh svoĭstv zamorozhennogo grunta],
Shchebolev, A.G., Problemy mekhaniki gruntov i inzhenernogo merzlotovedeniia; sbornik nauchnykh trudov (Problems in soil mechanics and engineering geocryology; collected scientific papers). Edited by IU.K. Zaretskiĭ, Moscow, Stroĭizdat, 1990, p.257-263, In Russian. 8 refs.
Shaft sinking, Mine shafts, Design, Frozen ground mechanics, Engineering geology, Geocryology, Rheology.

46-437
Cold snap of February 1991.
Brugge, R., *Weather*, Aug. 1991, 46(8), p.222-231, 2 refs.
Weather observations, Air temperature, Freezing, Synoptic meteorology, Winter, Meteorological charts, Atmospheric pressure, United Kingdom.

46-438
Spectroscopic measurements of the concentrations of CO, CH4, and N2O in the atmosphere of the central Arctic at station SP-28.
Grechko, E.I., et al, *Akademiia nauk SSSR. Izvestiia. Atmospheric and oceanic physics*, Dec. 1990, 26(5), p.402-404, Translated from Izvestiia. Fizika atmosfery i okeana, 1990. 9 refs.
Dzhola, A.V.
Polar atmospheres, Chemical analysis, Spectroscopy, Air pollution, Atmospheric composition, Environmental impact.

46-439
Effect of the surface charge of droplets on the nucleation rate of ice.
Dubrovich, N.A., et al, *Akademiia nauk SSSR. Izvestiia. Atmospheric and oceanic physics*, Jan. 1991, 26(6), p.462-465, Translated from Izvestiia. Fizika atmosfery i okeana, 1990. 20 refs.
Kuz'min, V.L., Dovgaliuk, IU.A.
Supercooled fog, Ice formation, Heterogeneous nucleation, Electric fields, Cloud droplets, Nucleation rate, Surface energy, Polarization (charge separation)

46-440
Arctic carbon sinks: present and future.
Walsh, J.J., *Global biogeochemical cycles*, Dec. 1989, 3(4), p.393-411, Refs. p.406-411.
Global warming, Surface temperature, Carbon dioxide, Polar atmospheres, Sea ice distribution, Ice melting, Biomass, Albedo, Photosynthesis, Climatic changes, Air water interactions.
Surface air temperatures of the arctic rose 1.2-1.5 C from 1880 to 1980, in contrast to a global warming of only 0.4-0.5 C, since 1980, six of the warmest years in the past century have been observed. Polar enhancement of a temperature rise, induced possibly by anthropogenic release of "greenhouse" gases, CO2, N2O, CH4, and freons, to the atmosphere, is attributed to altered ice/snow albedo at sea level, i.e., melting of sea ice. A 5% decline of sea ice extent in the Arctic and Antarctic from 1979 to 1987 may have resulted in increased light availability within previously ice-covered polar regions. If such a short-term trend were to continue, it might lead to a negative biogeochemical feedback, i.e., enhanced extraction of atmospheric CO2 during marine photosynthesis. As a consequence of deep vertical mixing in the antarctic ocean, however, primary production during the austral summer may have actually declined in response to a reduction in extent of meltwater regions, where stratified water columns allow carbon fixation tenfold that of open water. In contrast, within shallow adjacent seas of the Arctic Ocean, where shelf regions are tenfold larger than those of the Antarctic, the positive global consequences of greenhouse warming at polar latitudes will probably be felt first. Specifically, the Pacific-influenced regions of the Chukchi and East Siberian Seas, where sufficient nutrients and shallow depths prevail, now have annual primary productions of >200 g C sq m/yr, tenfold that of other high arctic shelves, and may supply 50% of the carbon respiration demands within the halocline of the deep Canadian and Eurasian basins via brine-mediated run-off. Continued melting of ice in the Arctic could increase by an order of magnitude the present CO2 sink of approx. one million t C/yr. (Auth. mod.)

46-441
Recommendations for the design of protective civil defense structures in permafrost areas. [Rekomendatsii po proektirovaniiu zashchitnykh sooruzheniĭ grazhdanskoĭ oborony v raĭonakh rasprostraneniia vechnomerzlykh gruntov],
Aleksandrova, V.V., ed, Leningrad, LenZNIIEP, 1990, 100p., In Russian.
Design, Cold weather construction, Permafrost beneath structures, Engineering geology, Permafrost thermal properties, Thaw depth, Foundations, Structures.

46-442
Snow generators and their area of application. [Snegogeneratory i oblast' ikh primeneniia],
Osodoev, M.T., et al, Yakutsk, SO AN SSSR, 1990, 72p., In Russian. 51 refs.
Bozhedonov, A.I., Tokareva, L.G.
Artificial snow, Dust control, Mining.

46-443
Paleogeography of the Sallayoksk Depression in the post-glacial period (southwestern part of the Kola Peninsula). [Paleogeografiia Sallaĭokskoĭ depressii v pozdnelednikov'e (iugo-zapadnaia chast' Kol'skogo poluostrova)],
Kol'ka, V.V., et al, Aktual'nye problemy geologii, petrologii i geokhimii Baltiĭskogo shchita (Problems in geology, petrology, and geochemistry of the Baltic Shield). Edited by A.I. Golubev, Petrozavodsk, Karel'skiĭ nauchnyĭ tsentr AN SSSR, 1990, p.111-119, In Russian. 6 refs.
Gorbunov, E.O.
Glacial deposits, Quaternary deposits, Geomorphology, Moraines.

46-444
Determining the strength and deformation characteristics of frozen peat. [Opredelenie prochnostnykh i deformatsionnykh kharakteristik merzlogo torfa],
Trofimov, V.I., et al, Fizicheskie protsessy torfianogo proizvodstva; mezhvuzovskiĭ nauchnyĭ sbornik (Physical processes of peat production; an interuniversity scientific collection). Edited by E.T. Bazin, Tver', Politekhnicheskiĭ institut, 1990, p.16-20, In Russian. 6 refs.
Smirnov, V.A.
Peat, Frozen ground strength, Rheology, Analysis (mathematics).

46-445
Criteria for the limit stress of frozen peat. [Kriterii predel'nogo napriazhennogo sostoianiia merzlogo torfa].
Mironov, V.A., et al, Fizicheskie protsessy torfianogo proizvodstva; mezhvuzovskiĭ nauchnyĭ sbornik (Physical processes of peat production; an interuniversity scientific collection). Edited by E.T. Bazin, Tver', Politekhnicheskiĭ institut, 1990, p.82-93, In Russian. 3 refs.
Smirnov, V.A.
Peat, Analysis (mathematics), Stress strain diagrams, Frozen ground strength.

46-446
Effect of water seepage and thermal settlement of thawing ground on thaw depth. [Vliianie infil'tratsii vody i teplovoĭ osadki ottaiavshego grunta na glubinu protaivaniia].
Gamaiunov, N.I., et al, Fizicheskie protsessy torfianogo proizvodstva; mezhvuzovskiĭ nauchnyĭ sbornik (Physical processes of peat production; an interuniversity scientific collection). Edited by E.T. Bazin, Tver', Politekhnicheskiĭ institut, 1990, p.94-104, In Russian. 12 refs.
Stotland, D.M., Shekhab, Kh.IU.
Seepage, Settlement (structural), Thaw depth, Ground thawing, Analysis (mathematics).

46-447
Use of single-Doppler radar for estimating maximum hailstone size.
Witt, A., et al, *Journal of applied meteorology*, Apr 1991, 30(4), p.425-431, 40 refs.
Nelson, S.P.
Hailstones, Precipitation (meteorology), Detection, Radar echoes, Weather forecasting, Physical properties, Analysis (mathematics), Storms.

46-448
Acoustic reflections from arctic ice at 15-300 kHz.
Garrison, G.R., et al, *Acoustical Society of America. Journal*, Aug. 1991, 90(2)pt.1, p.973-984, 13 refs.
Francois, R.E., Wen, T.
Sea ice, Ice acoustics, Underwater acoustics, Acoustic measurement, Wave propagation, Reflectivity, Ice bottom surface, Brines, Surface roughness.

46-449
Wave propagation in anisotropic liquid-saturated porous solids.
Sharma, M.D., et al, *Acoustical Society of America. Journal*, Aug. 1991, 90(2)pt.1, p.1068-1073, 9 refs.
Gogna, M.L.
Porous materials, Seismic reflection, Seismic velocity, Wave propagation, Analysis (mathematics), Sea ice, Ice water interface.

46-450
Use of construction materials and resource-preserving technologies in oil and gas fields in the North. [Primenenie stroitel'nykh materialov i resursoberegaiushchikh tekhnologiĭ v neftegazovoĭ otrasli Severa; sbornik nauchnykh trudov].
Andreev, V.V., ed, Moscow, VNII po str-vu magistr. truboprovodov, 1990, 183p., In Russian. For selected papers see 46-451 through 46-456.
Foundations, Stresses, Corrosion, Permafrost beneath structures, Cold weather construction, Pipelines.

46-451
Formation of thaw aureoles in the main section of the Yamburg-Elets gas pipeline. [Formirovanie oreolov ottaivaniia na golovnom uchastke gazoprovoda IAmburg-Elets].
Semerikov, A.V., et al, Primenenie stroitel'nykh materialov i resursoberegaiushchikh tekhnologiĭ v neftegazovoĭ otrasli Severa; sbornik nauchnykh trudov (Use of construction materials and resource-preserving technologies in oil and gas fields in the North; collected scientific papers). Edited by V.V. Andreev, Moscow, VNII po str-vu magistr. truboprovodov, 1990, p.5-10, In Russian.
Lisin, V.N., Sharygin, V.M., Birillo, I.N.
Ground thawing, Gas pipelines, Analysis (mathematics).

46-452
Thermal interaction of slab foundations with permafrost. [Teplovoe vzaimodeĭstvie plitnogo fundamenta s vechnomerzlym gruntom].
Bronnikova, N.A., et al, Primenenie stroitel'nykh materialov i resursoberegaiushchikh tekhnologiĭ v neftegazovoĭ otrasli Severa; sbornik nauchnykh trudov (Use of construction materials and resource-preserving technologies in oil and gas fields in the North; collected scientific papers). Edited by V.V. Andreev, Moscow, VNII po str-vu magistr. truboprovodov, 1990, p.18-22, In Russian. 2 refs.
Miroshnichenko, P.I., Semerikov, A.V.
Foundations, Permafrost beneath structures, Thaw depth, Thermal insulation, Permafrost thermal properties.

46-453
Methodology for the optimal design of foundations under oil reservoirs in permafrost. [O metodologii optimal'nogo proektirovaniia fundamentov pod neftianye rezervuary na vechnomerzlykh gruntakh].
Serditova, N.A., et al, Primenenie stroitel'nykh materialov i resursoberegaiushchikh tekhnologiĭ v neftegazovoĭ otrasli Severa; sbornik nauchnykh trudov (Use of construction materials and resource-preserving technologies in oil and gas fields in the North; collected scientific papers). Edited by V.V. Andreev, Moscow, VNII po str-vu magistr. truboprovodov, 1990, p.61-68, In Russian. 5 refs.
Shutov, V.E.
Foundations, Permafrost beneath structures, Design, Design criteria, Oil storage.

46-454
Stresses in massive ground during the freezing of frost heaving ground in foundations for pipeline supports. [Napriazheniia v gruntovom massive pri promerzanii puchinistogo grunta v osnovanii opory truboprovoda].
Natrov, G.V., et al, Primenenie stroitel'nykh materialov i resursoberegaiushchikh tekhnologiĭ v neftegazovoĭ otrasli Severa; sbornik nauchnykh trudov (Use of construction materials and resource-preserving technologies in oil and gas fields in the North; collected scientific papers). Edited by V.V. Andreev, Moscow, VNII po str-vu magistr. truboprovodov, 1990, p.99-103, In Russian. 5 refs.
Agibaeva, T.V.
Stresses, Soil freezing, Frost heave, Pipeline supports, Foundations.

46-455
Characteristics of corrosion in metal structures in the soil and atmosphere of northern Western Siberia. [Osobennosti korrozii metallicheskikh konstruktsiĭ v gruntakh i atmosfere Severa Zapadnoĭ Sibiri].
Sanzharovskaia, S.F., et al, Primenenie stroitel'nykh materialov i resursoberegaiushchikh tekhnologiĭ v neftegazovoĭ otrasli Severa; sbornik nauchnykh trudov (Use of construction materials and resource-preserving technologies in oil and gas fields in the North; collected scientific papers). Edited by V.V. Andreev, Moscow, VNII po str-vu magistr. truboprovodov, 1990, p.113-119, In Russian.
Shur, N.M.
Corrosion, Metals, Structures, Soil water, Water chemistry, Steel structures, Atmosphere composition, Cold weather construction.

46-456
Anticorrosive materials for metal piles, used in the development of gas-condensate fields in northern Western Siberia. [Antikorrozionnye materialy dlia metallicheskikh svaĭ, ispol'zuemykh pri obustroĭstve gazokondensatnykh mestorozhdeniĭ Severa Zapadnoĭ Sibiri].
Polozov, A.E., et al, Primenenie stroitel'nykh materialov i resursoberegaiushchikh tekhnologiĭ v neftegazovoĭ otrasli Severa; sbornik nauchnykh trudov (Use of construction materials and resource-preserving technologies in oil and gas fields in the North; collected scientific papers). Edited by V.V. Andreev, Moscow, VNII po str-vu magistr. truboprovodov, 1990, p.120-123, In Russian.
Sanzharovskaia, S.F.
Corrosion, Countermeasures, Protective coatings, Piles, Polymers, Cold weather construction.

46-457
Experimental study of oil spreading in ice covered waters.
Belaskas, D.P., et al, National Conference on Hydraulic Engineering, San Diego, CA, July 30-Aug. 3, 1990. Proceedings. Edited by H.H. Chang et al, New York, NY, American Society of Civil Engineers, 1990, p.26-31, 2 refs.
Yapa, P.D.
Oil spills, Ocean environments, Ice cover effect, Subglacial observations, Dispersions, Permeability.

46-458
Flow distribution in multiple channels with partial ice coverage.
Ashton, G.D., MP 2954, National Conference on Hydraulic Engineering, San Diego, CA, July 30-Aug. 3, 1990. Proceedings. Edited by H.H. Chang et al, New York, NY, American Society of Civil Engineers, 1990, p.32-38, 1 ref.
Channels (waterways), River flow, Ice water interface, River ice, Ice cover effect, Analysis (mathematics), Roughness coefficient, Hydraulics.

46-459
Discrete element simulation of river ice jams.
Babić, M., et al, National Conference on Hydraulic Engineering, San Diego, CA, July 30-Aug. 3, 1990. Proceedings. Edited by H.H. Chang et al, New York, NY, American Society of Civil Engineers, 1990, p.39-44, 8 refs.
Shen, H.T., Shen, H.H.
River ice, River flow, Ice jams, Ice water interface, Computerized simulation, Hydrodynamics.

46-460
Soluble pollutant enrichment in snow covers.
Akan, A.O., National Conference on Hydraulic Engineering, San Diego, CA, July 30-Aug. 3, 1990. Proceedings. Edited by H.H. Chang et al, New York, NY, American Society of Civil Engineers, 1990, p.81-84, 4 refs.
Snow impurities, Snow cover stability, Snowmelt, Metamorphism (snow), Water flow, Mathematical models, Snow heat flux, Solubility.

46-461
Computation of sediment transport resulting from snowmelt and rainfall in a Sierra Nevada watershed.
Lee, W.H., et al, National Conference on Hydraulic Engineering, San Diego, CA, July 30-Aug. 3, 1990. Proceedings. Edited by H.H. Chang et al, New York, NY, American Society of Civil Engineers, 1990, p.688-693, 9 refs.
Combs, S.T.
Watersheds, Sediment transport, Snowmelt, Runoff forecasting, Computerized simulation, Water erosion, Reservoirs.

46-462
Concurrent remote sensing of arctic sea ice from submarine and aircraft.
Wadhams, P., et al, *International journal of remote sensing*, Sep. 1991, 12(9), MP 2955, p.1829-1840, 8 refs. For other versions see 44-3376 and 45-563.
Davis, N.R., Comiso, J.C., Kutz, R., Crawford, J., Jackson, G., Krabill, W., Sear, C.B., Swift, R., Tucker, W.B.
Ice surveys, Sea ice, Aerial surveys, Ice surface, Subglacial observations, Correlation, Classifications, Acoustic measurement, Synthetic aperture radar, Submarines, Radiometry, Lasers.
In May 1987 a concurrent remote sensing study of arctic sea ice from above and below was carried out. A submarine equipped with sidescan and upward looking sonar collaborated with two remote sensing aircraft equipped with passive microwave, synthetic aperture radar (SAR), a laser profilometer and an infrared radiometer. By careful registration of the three tracks it has been possible to find relationships between ice type, ice morphology and thickness, SAR backscatter and microwave brightness temperatures. The key to the process has been the sidescan sonar's ability to identify ice type through differences in characteristic topography. Over a heavily ridged area of mainly multiyear ice there is a strong positive correlation between SAR backscatter and ice draft or elevation. It was also found that passive and active microwave complement each other in that SAR has a high contrast between open water and multiyear ice, while passive microwave has a high contrast between open water and first-year ice. (Auth. mod.)

46-463
Automatic extraction of spring-time arctic ambient noise transients.
Zakarauskas, P., et al, *Acoustical Society of America. Journal*, July 1991, 90(1), p.470-474, 15 refs.
Parfitt, C.J., Thorleifson, J.M.
Sea ice, Pack ice, Cracking (fracturing), Acoustic measurement, Ice acoustics, Underwater acoustics, Data processing, Wave propagation, Computer programs, Detection.

46-464
Tritium in the snow and firn deposits at Vostok Station: results of analysis and methodological aspects.
Anan'in, E.G., et al. *Water resources*, July 1991, 17(5), p.545-549, Translated from Vodnye resursy, 1990, No.5. 6 refs.
Boroukhin, E.A., Il'ichev, V.I.
Snow accumulation, Snow cover, Snow composition, Firn, Isotope analysis, Topographic effects, Periodic variations, Atmospheric circulation.
The results of measuring tritium in the snow and firn deposits in 1972-1973 at Vostok Station are compared with the data for the Amundsen-Scott Station and a section from the Dumont d'Urville Station to Dome C. The new data do not contradict the hypothesis about an anomalous tritium fallout in 1973 in the polar region. The need to take into account the effect of this anomaly and processes of the distribution and redeposition of the snow-firn mass in the lower layers of the atmosphere when estimating the contribution of the "height" and "continental" effects is pointed out. The region of Dome C is prospective for obtaining such an estimate. The conditions of storing samples of antarctic firn for subsequent measuring of the tritium content in them are discussed. (Auth.)

46-465
Field investigations on the snow chemistry in central and southern California—1. Inorganic ions and hydrogen peroxide.
Gunz, D.W., et al. *Atmospheric environment*, 1990, 24A(7), p.1661-1671, Refs. p.1669-1671.
Hoffmann, M.R.
Snow cover, Mountains, Sampling, Snow impurities, Ion density (concentration), Chemical analysis, Aerosols, Air pollution, Atmospheric circulation.

46-466
Field investigations on the snow chemistry in central and southern California—2. Carbonyls and carboxylic acids.
Gunz, D.W., et al. *Atmospheric environment*, 1990, 24A(7), p.1673-1684, Refs. p.1682-1684.
Hoffmann, M.R.
Snow cover, Mountains, Snow impurities, Sampling, Chemical analysis, Air pollution, Chemical properties, Scavenging, Atmospheric circulation.

46-467
Surface level and water table fluctuations in a subarctic fen.
Roulet, N.T., *Arctic and alpine research*, Aug. 1991, 23(3), p.303-310, 23 refs.
Wetlands, Subarctic landscapes, Water table, Water balance, Thaw depth, Surface waters, Water storage, Peat, Seepage.

46-468
Evaluation of ice-rafted erosion caused by an icefoot complex, southwestern Lake Michigan, U.S.A.
Miner, J.J., et al. *Arctic and alpine research*, Aug. 1991, 23(3), p.320-327, 20 refs.
Powell, R.D.
Lake ice, Fast ice, Grounded ice, Ice rafting, Shore erosion, Sediment transport, Breakup, Drift, Water waves.

46-469
Reflecting properties of screens covered with atmospheric precipitation.
Boyarskii, D.A., et al, *Telecommunications and radio engineering*, Mar. 1990, 45(3), p.136-139, Translated from Radiotekhnika, 1990, No.2. 7 refs.
Kliorin, N.I., Mirovskii, V.G.
Radio waves, Reflectivity, Latticed structures, Antennas, Precipitation (meteorology), Snow cover effect, Radio communications, Wave propagation.

46-470
On the stable growth of segregated ice in freezing soil under negligible overburden pressure.
Nakano, Y., *Advances in water resources*, Dec. 1986, 9(4), MP 2956, p.223-235, 10 refs.
Soil freezing, Soil water migration, Ice growth, Ice lenses, Soil pressure, Frost heave, Minerals, Analysis (mathematics), Frozen ground mechanics.
The stable growth condition of a segregated ice layer is studied by the use of the principle of mass and heat conservation. This condition evidently depends upon the properties of a thin transitional zone, which is believed to exist between the boundary of an ice layer and a 0 C isotherm. All probable models of the transitional zone are classified and the conditions for each model is derived. The effect of the small amount of soil minerals contained in an ice layer is also studied.

46-471
Structural characteristics of cryosphere on Fildes Peninsula, King George Island, West Antarctica.
Zhu, C., et al, *Antarctic research*, 1990, 2(4), p.1-10, In Chinese with English summary. 12 refs.
Cui, Z.J.
Permafrost surveys, Permafrost thickness, Frozen rocks, Frozen ground, Electrical resistivity, Antarctica - Fildes Peninsula.
Data from pitting, geoelectrical prospecting, temperature measurements and analysis of ice water content and salinity indicate that the permafrost table of Asti fix Hill on Fildes Peninsula is found at 1.5 m depth, increasing or decreasing from 0.3 to 0.5 m with the altitude of the hilltop. The structure of the cryosphere consists of 5 layers: active, frozen sand gravel, frozen volcanic rock permeated by sea water, frozen volcanic rock not permeated by sea water, and unfrozen ancient continental base. The permafrost thickness ranges from 80-150 m. (Auth. mod.)

46-472
Grain growth in firn on Law Dome ice cap, East Antarctica.
Li, J., et al, *Antarctic research*, 1990, 2(4), p.11-20, In Chinese with English summary. 18 refs.
Young, N.W., Malcolm, P.F.
Grain size, Snow accumulation, Ice crystal growth, Air temperature, Antarctica - Law Dome.
The detailed studies of firn grain mean area at 16 sites on Law Dome indicate that the enhanced grain growth, in several meters near the snow surface, is more apparent in low accumulation areas, declining with the increase of accumulation rate. This can be attributed to the short staying period of snow near the surface, caused by the higher accumulation rate. The variation of mean grain area with both depth and age can be approximately represented by linear relations. The rate of increase of mean area versus depth decreases markedly with accumulation rates, due to very large differences in accumulation rates between the sampling sites. Growth rate versus temperature, at about -17° C, starts to depart from the temperature dependence of crystal growth rate established by Gow (1975), suggesting that the activation energy for the growth process increases with increasing temperature. (Auth.)

46-473
Repeated compression-annealing experiments on anisotropic core ice.
Huang, M.H., et al, *Antarctic research*, 1990, 2(4), p.21-27, In Chinese with English summary. 12 refs.
Wang, W.T., Li, T., Li, G.
Ice cores, Recrystallization, Anisotropy, Ice crystal size, Ice creep, Strain tests.
Three runs (6 samples) of repeated uniaxial compression-annealing experiments were conducted on a creep testing machine with a loading precision within 1% at -2 + -0.2 C. The tested samples were cut from a BHQ ice core. The samples were compressed with an initial axial stress of 0.8 MPa, until 10% axial strain was obtained, and then annealed for 72 hours. Such compression-annealing procedure was repeated 6 times for each run. The experimental results show that under a warm temperature and large load, the initial features of structure and fabric disappear, a small circle girdle fabric with fine equigranular grains appears, and a multi-maxima fabric develops to some extent. Analysis of structure and fabric shows that the formation mechanism of new fabrics in these experiments is principally recrystallization. With the repetition of compression-annealing, the difference in the fabric of the 6 samples decreases, their rheological behavior tends to be uniform, and their grain size decreases towards a steady state value. (Auth. mod.)

46-474
Bases and foundations of residential and public buildings in northern regions; collected scientific papers.
[Osnovaniia i fundamenty zhilykh i obshchestvennykh zdanii v severnykh raionakh; sbornik nauchnykh trudov].
Velli, IU.IA., ed. Leningrad, LenZNIIEP, 1990, 108p., In Russian. For individual papers see 46-475 through 46-486.
Foundations, Deformation, Cold weather construction, Permafrost beneath structures, Saline soils, Frozen ground strength, Piles, Design, Analysis (mathematics).

46-475
Questions in building foundations on plastic-frozen ground on the Yamal Peninsula. [Voprosy fundamentostroeniia na plastichnomerzlykh gruntakh poluostrova IAmal].
Grishin, P.A., et al, Osnovaniia i fundamenty zhilykh i obshchestvennykh zdanii v severnykh raionakh; sbornik nauchnykh trudov (Bases and foundations of residential and public buildings in northern regions; collected scientific papers). Edited by IU.IA. Velli, Leningrad, LenZNIIEP, 1990, p.4-9, In Russian. 3 refs.
IArkin, A.N.
Foundations, Cold weather construction, Permafrost beneath structures.

46-476
Deformation of buildings and structures in arctic territories. [Deformatsii zdanii i sooruzhenii na arkticheskikh territoriiakh].
Velli, IU.IA., Osnovaniia i fundamenty zhilykh i obshchestvennykh zdanii v severnykh raionakh; sbornik nauchnykh trudov (Bases and foundations of residential and public buildings in northern regions; collected scientific papers). Edited by IU.IA. Velli, Leningrad, LenZNIIEP, 1990, p.10-14, In Russian.
Deformation, Buildings, Structures.

46-477
Results of observations of residential houses undergoing deformation in the Tiksi hydrographic base. [Rezul'taty nabliudenii za deformiruiushchimsia zhilym domom Tiksinskoi gidrograficheskoi bazy].
IArkin, A.N., Osnovaniia i fundamenty zhilykh i obshchestvennykh zdanii v severnykh raionakh; sbornik nauchnykh trudov (Bases and foundations of residential and public buildings in northern regions; collected scientific papers). Edited by IU.IA. Velli, Leningrad, LenZNIIEP, 1990, p.15-22, In Russian.
Deformation, Houses, Frozen ground temperature.

46-478
Bearing strength of piles, sunken into locally thawed soils, during the thawing period. [O nesushchei sposobnosti svai, pogruzhennykh v lokal'no ottaiannyi grunt, v period ekspluatatsionnogo ottaivaniia].
Sheinkman, D.R., Osnovaniia i fundamenty zhilykh i obshchestvennykh zdanii v severnykh raionakh, sbornik nauchnykh trudov (Bases and foundations of residential and public buildings in northern regions; collected scientific papers). Edited by IU.IA. Velli, Leningrad, LenZNIIEP, 1990, p.23-40, In Russian.
Piles, Ground thawing, Bearing strength, Pile load tests.

46-479
Shear strength of frozen ground with respect to material. [O soprotivlenii sdvigu merzlogo grunta po materialu].
Gerasimov, A.S., Osnovaniia i fundamenty zhilykh i obshchestvennykh zdanii v severnykh raionakh, sbornik nauchnykh trudov (Bases and foundations of residential and public buildings in northern regions, collected scientific papers). Edited by IU.IA. Velli, Leningrad, LenZNIIEP, 1990, p.41-49, In Russian. 20 refs.
Shear strength, Frozen ground strength, Construction materials, Analysis (mathematics).

46-480
Adfreezing strength of frozen saline soils in Yamal. [O prochnosti smerzaniia merzlykh zasolennykh gruntov IAmala].
Brushkov, A.V., et al, *Osnovaniia i fundamenty zhilykh i obshchestvennykh zdanii v severnykh raionakh*; sbornik nauchnykh trudov (Bases and foundations of residential and public buildings in northern regions; collected scientific papers). Edited by IU.IA. Velli, Leningrad, LenZNIIEP, 1990, p.50-54, In Russian. 2 refs.
Nikolaev, A.A., Tomina, G.A.
Saline soils, Frozen ground strength, Ice adhesion, Frozen ground mechanics.

46-481
Investigation of the thermal interaction between underground structures and permafrost. [Issledovanie teplovogo vzaimodeistviia podzemnykh sooruzhenii s vechnomerzlymi gruntami].
Bronfenbrener, L.E., et al, Osnovaniia i fundamenty *zhilykh i obshchestvennykh zdanii v severnykh* raionakh; sbornik nauchnykh trudov (Bases and foundations of residential and public buildings in northern regions; collected scientific papers). Edited by IU.IA. Velli, Leningrad, LenZNIIEP, 1990, p.55-66, In Russian. 14 refs.
Zolotar', A.I.
Thermal regime, Frozen ground thermodynamics, Thaw depth, Underground facilities, Subsurface structures, Permafrost thermal properties, Analysis (mathematics).

46-482
Role of the phase composition of moisture in the formation of strength properties in frozen ground. [Rol' fazovogo sostava vlagi v formirovanii prochnostnykh svoistv merzlykh gruntov].
Chistotinov, L.V., et al, Osnovaniia i fundamenty zhilykh i obshchestvennykh zdanii v severnykh raionakh, sbornik nauchnykh trudov (Bases and foundations of residential and public buildings in northern regions; collected scientific papers). Edited by IU.IA. Velli, Leningrad, LenZNIIEP, 1990, p.67-76, In Russian. 15 refs.
Brushkov, A.V., Petrukhin, IU.S.
Moisture, Frozen ground strength, Phase transformations, Soil water, Analysis (mathematics).

46-483
Rheological characteristics of the artificial buildup of ice. [Reologicheskie kharakteristiki posloino namorozhennogo l'da].
Aleksandrov, I.G., Osnovaniia i fundamenty zhilykh i obshchestvennykh zdanii v severnykh rationakh; sbornik nauchnykh trudov (Bases and foundations of residential and public buildings in northern regions; collected scientific papers). Edited by IU.IA. Velli, Leningrad, LenZNIIEP, 1990, p.77-80, In Russian. 2 refs.
Rheology, Ice accretion, Artificial freezing.

46-484
Modular test piles. [Inventarnaia ispytatel'naia svaia].
Belostotskii, B.A., Osnovaniia i fundamenty zhilykh i obshchestvennykh zdanii v severnykh rationakh; sbornik nauchnykh trudov (Bases and foundations of residential and public buildings in northern regions; collected scientific papers). Edited by IU.IA. Velli, Leningrad, LenZNIIEP, 1990, p.81-86, In Russian. 3 refs.
Piles, Low temperature tests, Design.

46-485
Determining long-term resistance of frozen saline soils to uniaxial compression, based on resistance values of frozen nonsaline soils. [Opredelenie dlitel'nogo soprotivleniia odnoosnomu szhatiiu merzlykh zasolennykh gruntov po znacheniiam soprotivleniia merzlykh nezasolennykh gruntov].
Prokof'ev, IU.A., et al, Osnovaniia i fundamenty zhilykh i obshchestvennykh zdanii v severnykh rationakh; sbornik nauchnykh trudov (Bases and foundations of residential and public buildings in northern regions; collected scientific papers). Edited by IU.IA. Velli, Leningrad, LenZNIIEP, 1990, p.87-91, In Russian.
Aksenov, V.I.
Saline soils, Frozen ground compression, Analysis (mathematics).

46-486
Mathematical formula for the problem of optimal design of construction systems. [Matematicheskaia formulirovka zadach optimal'nogo proektirovaniia konstruktivnykh sistem].
Temnov, V.G., Osnovaniia i fundamenty zhilykh i obshchestvennykh zdanii v severnykh rationakh; sbornik nauchnykh trudov (Bases and foundations of residential and public buildings in northern regions; collected scientific papers). Edited by IU.IA. Velli, Leningrad, LenZNIIEP, 1990, p.92-107, In Russian. 9 refs.
Analysis (mathematics), Design, Cold weather construction, Design criteria.

46-487
European development in microwave radiometry: 1978-1988.
Windsor, E.P.L., et al, *International journal of remote sensing*, Aug. 1991, 12(8), p.1741-1751.
Charlton, J.E.
Remote sensing, Spacecraft, Design, Radiometry, Sensor mapping, Sea ice distribution, Instruments, Microwaves.

46-488
Contribution of Seasat to ice sheet glaciology.
Drewry, D.J., et al, *International journal of remote sensing*, Aug. 1991, 12(8), p.1753-1774, Refs. p.1772-1774.
Turner, J., Rees, W.G.
Spaceborne photography, Glaciology, Sea ice distribution, Sensor mapping, Synthetic aperture radar, Airborne radar, Radiometry, Topographic features, Synoptic meteorology.
The suite of sensors flown onboard Seasat during 1978 has provided glaciologists with valuable tools for the study of ice masses, particularly in the polar regions. Of the sensor package, the most useful instruments for glaciology have been the radar altimeter and the synthetic aperture radar. The former has demonstrated the ability to map the surface of ice sheets in considerable detail and over a very short period of time. Such maps provide the first step towards evaluating the long term mass balance of these ice masses. Such studies are of central importance to global climate modelling, investigation of the 'greenhouse effect' and prediction of world sea levels. Radar altimeter mapping has also provided unparalleled detail on surface topography relevant to ice dynamics investigations. The small dataset of Seasat Synthetic Aperture Radar (SAR) imagery gathered over ice masses, principally in Iceland and Greenland (there was no coverage of Antarctica), has begun to reveal useful detail of surface and near-surface phenomena such as flowlines, meltwater percolation, and snow and ice facies invaluable for glaciological reconnaissance. In particular, recent studies have shown the value of a multisensor approach with the combination of SAR and multi-spectral imagery. It is likely that X- and C-band SARs will prove better for snow and ice discrimination than the L-band system on Seasat. The Scatterometer and Scanning multi-channel microwave radiometer instruments on Seasat have yielded data over ice masses which are still in the early stages of evaluation. Nevertheless there are strong indications of the value of these data for investigation of surface melt phenomena and temperature-accumulation patterns. (Auth. mod.)

46-489
Mapping ice sheets with the altimeter.
McIntyre, N., *International journal of remote sensing*, Aug. 1991, 12(8), p.1775-1793, 31 refs.
Airborne radar, Spaceborne photography, Ice sheets, Height finding, Glacier surfaces, Sensor mapping, Topographic surveys, Glaciology.
The most basic glaciological requirement for investigations of ice sheets and ice shelves is a measurement of surface elevation. Prior to 1978, no technique operated from the surface, aircraft or satellites had provided elevation data with sufficient accuracy and spatial temporal coverage to address continent-wide problems such as whether the antarctic ice sheet is growing or shrinking. Although on an oceanographic mission, Seasat gave the first extensive evidence that a satellite radar altimeter can achieve high precision mapping for widespread glaciological application. In the decade since its launch, analysis of data from its brief mission has showed the capability of measuring elevations to an accuracy of up to 25 cm, mapping the outer margins of ice shelves, identifying grounding lines, profiling icebergs and providing information on surface features. Although problems such as coverage, mission continuity and special data processing still need to be addressed, Seasat has demonstrated the very real contributions which future altimeters such as that to be flown on ERS-1 will make to studies of the polar regions. (Auth.)

46-490
Science in Antarctica, Vol.1: Introduction. [Nankyoku no kagaku, 1: Sosetsu].
Kusunoki, K., ed, Tokyo, National Institute of Polar Research, 1991, 295p., In Japanese. Refs. p.279-290.
Research projects, Geological surveys, Glacier surveys, Oceanographic surveys, Meteorology, Cryobiology, Antarctica.
This is Vol.1, but the last published, of a series of nine volumes on science in Antarctica. The other eight volumes, published from 1982 to 1989, are on the aurora and upper atmosphere, meteorology, ice and snow, earth sciences, meteorites, biology, oceanography, and data compilation. This volume, titled "Introduction," both introduces and summarizes the entire series. Topics include geology, solid earth physics, snow and ice, the cryosphere, ice cores, oceanography, submarine topography, sea ice, ocean chemistry, meteorology, the ozone hole, the aurora, upper atmospheric physics, meteorites, terrestrial and marine biology, medical research, Japanese research facilities, and international cooperation. Also included is a chronological table of major historical events and scientific activities in Antarctica from 1675 to 1989. The text and figures are all in Japanese but there are English-language terms scattered throughout and a bibliography of about 290 references of which a few are in Russian, about 50 in Japanese, and the rest in English.

46-491
Ice nucleation by monolayers of aliphatic alcohols.
Popovitz-Biro, R., et al, *Makromolekulare Chemie. Macromolecular symposia*, 1991, Vol.46, p.125-132, 15 refs.
Gavish, M., Lahav, M., Leiserowitz, L.
Nucleation, Ice crystal nuclei, Organic nuclei, Molecular structure, Ice crystal growth, Monomolecular films, Ice crystal structure.

46-492
Sublimation of snow intercepted by an artificial conifer.
Schmidt, R.A., *Agricultural and forest meteorology*, 1991, Vol.54, p.1-27, 24 refs.
Snow evaporation, Snow retention, Snow air interface, Vegetation factors, Sublimation, Wind factors.

46-493
Use and care of the extended cold weather clothing system (ECWCS).
U.S. Army Natick Research, Development and Engineering Center, Natick, MA, 1987, 54p. ADA-187 998.
Clothing, Military equipment, Cold weather survival.

46-494
Fractal nature of the sea ice draft profile.
Key, J., et al, *Geophysical research letters*, Aug. 1991, 18(8), p.1437-1440, 8 refs.
McLaren, A.S.
Sea ice, Ice bottom surface, Acoustic measurement.

46-495
Initial measurement of CO2 concentrations (1530 to 1940 AD) in air occluded in the GISP 2 ice core from central Greenland.
Wahlen, M., et al, *Geophysical research letters*, Aug. 1991, 18(8), p.1457-1460, 26 refs.
Allen, D., Deck, B., Herchenroder, A.
Ice sheets, Carbon dioxide, Gas inclusions, Greenland.

46-496
Observations of muons using the polar ice cap as a Cerenkov detector.
Lowder, D.M., et al, *Nature*, Sep. 26, 1991, 353(6342), p.331-333, 11 refs.
Ice sheets, Radiation measuring instruments, Greenland, Antarctica - Amundsen-Scott Station.
Detection of the small flux of extraterrestrial neutrinos expected at energies above 1 TeV, and identification of their astrophysical point sources, will require neutrino telescopes with effective areas measured in square kilometers, much larger than detectors now existing. Such a device can be built only by using some naturally occurring detecting medium of enormous extent: deep antarctic ice is a strong candidate. A neutrino telescope could be constructed by drilling holes in the ice with hot water into which photomultiplier tubes could be placed to a depth of 1 km. Neutrinos would be recorded, as in underground neutrino detectors using water as the medium, by the observation of Cerenkov radiation from secondary muons. The AMANDA (Antarctic Muon and Neutrino Detector Array) project has been started to test this idea. Described here is a pilot experiment using photomultiplier tubes placed into arctic ice in Greenland. Cerenkov radiation from muons was detected, and a comparison of count rate with the expected muon flux indicates that the ice is very transparent, with an absorption length greater than 18 m. These results suggest that a full-scale antarctic ice detector is technically quite feasible. (Auth.)

46-497
Sub-ice topography and meteorite finds near the Allan Hills and the Near Western Ice Field, Victoria Land, Antarctica.
Delisle, G., et al, *Journal of geophysical research*, Aug. 25, 1991, 96(E1), p.15,577-15,587, 24 refs.
Sievers, J.
Glacier flow, Topographic surveys, Rocks, Sediment transport, Radio echo soundings, Subglacial observations, Tectonics, Topographic effects, Sublimation, Wind factors, Antarctica, Victoria Land.
In this paper, glaciological causes of large meteorite concentrations on blue ice fields west and southwest of the Allan Hills in Antarctica have been investigated. A sub-ice topography map for the area was prepared from data of a radio echo sounding survey. The map reveals a mesa-type paleosurface formed prior to and modified by glacial processes during the initial stage of glaciation of Antarctica. Ice flow toward Mawson Glacier north of the Allan Hills is largely confined to a N-S trending depression between the Allan Hills Ice Field and the Near Western Ice Field. Blue ice at the margins of the ice stream flows over the mesas on both sides of this depression. Meteorites entrained in blue ice are uncovered by sublimation and ablation. It is proposed that currently almost all of the blue ice flowing into the Allan Hills Ice Field is sublimated, leaving meteorites on the ice surface, and that windblown meteorites are trapped by snow bridges across crevasses, resulting in a near-surface meteorite concentration near the ice ridges of the Allan Hills Ice Field. Nevertheless, most meteorites are exposed for only a short period of time to the atmosphere before they are blown by the wind across the ice toward the western foot of the Allan Hills, from where they are slowly carried northward to Mawson Glacier and the Ross Sea. (Auth. mod.)

46-498
Ganymede and Callisto: complex crater formation and planetary crusts.
Schenk, P.M., *Journal of geophysical research*, Aug. 25, 1991, 96(E1), p.15,635-15,664, Refs. p.15,662-15,664.
Satellites (natural), Regolith, Extraterrestrial ice, Ground ice, Geologic processes, Landforms, Topographic features, Geomorphology, Planetary environments.

46-499
Thermal stress tectonics on the satellites of Saturn and Uranus.
Hillier, J., et al, *Journal of geophysical research*, Aug. 25, 1991, 96(E1), p.15,665-15,674, 35 refs.
Squyres, S.W.
Satellites (natural), Phase transformations, Regolith, Extraterrestrial ice, Tectonics, Thermal expansion, Rheology, Thermal stresses, Temperature variations.

46-500
Control network of Triton.
Davies, M.E., et al, *Journal of geophysical research*, Aug. 25, 1991, 96(E1), p.15,675-15,681, 12 refs.
Rogers, P.G., Colvin, T.R.
Satellites (natural), Photogrammetric surveys, Spaceborne photography, Image processing, Triton, Statistical analysis, Extraterrestrial ice.

46-501
On short term prediction of high reflectivity snow in central Europe.
Essenwanger, O.M., Electro-Optical Systems Atmospheric Effects Library/Tactical Weather Intelligence (EOSAEL/TWI) Annual Conference, 11th, Las Cruces, NM, Nov. 27-30, 1990. Proceedings, U.S. Army Atmospheric Sciences Laboratory, 1991, p.110-119, 4 refs.
Snow surface, Radar echoes, Reflectivity, Snow surveys.

46-502
Surface decoupling above snow-covered terrain.
Hogan, A.W., et al. MP 2957. Electro-Optical Systems Atmospheric Effects Library Tactical Weather Intelligence (EOSAEL TWI) Annual Conference, 11th, Las Cruces, NM, Nov 27-30, 1990. Proceedings. U.S. Army Atmospheric Sciences Laboratory, 1991, p.120-131, 24 refs.
Ferrick, M.G.
Snow air interface, Snow temperature, Surface temperature, Temperature inversions, Temperature variations, Snow cover effect.
Inversions and multiple inversions frequently decouple the boundary layer above snow-covered ground from the prevailing *tropospheric flow*. This decoupling is strongly evident over areas of great local relief, experiments in the Connecticut River Valley showed the surface at many elevations to be decoupled from the lower troposphere during the winter of 1989-1990. Experimental measurements of surface air temperature near the time of sunrise indicated lags of 8 C over level ground accompanying warm advection. Morning temperature differences of 10 C were found over horizontal distances of 3 km and elevation differences of 200 m. The greatest temperature differences were found on cloudless mornings, but many cloudy mornings had terrain-related temperature variations of 2 C or greater. Temperatures over frozen bodies of water differed from those of adjacent terrain, with this temperature difference related to amount of snow cover, slope of adjacent terrain, and rate of ice production on the water body. This surface decoupling can complicate operational forecasting or nowcasting of infrared temperature contrast, optical surface definition, radar ducting, glazing or riming, and the freezing of water surfaces. Some analytical techniques are described.

46-503
Comparison between active and passive microwave measurements of the antarctic ice sheet and their association with the surface katabatic winds.
Remy, F., et al. *Journal of glaciology*, 1991, 37(125), p.3-10, 20 refs.
Minster, J.F.
Ice sheets, Glacier surfaces, Height finding, Remote sensing, Radiometry, Glacier mass balance, Topographic effects, Wind factors, Microwaves, Ice air interface, Surface roughness.
The intensity of the Seasat altimeter return power over Antarctica varies in strong correlation with the intensity of model katabatic winds. It is also strongly correlated with the polarization of the passive microwave signal at 37 GHz of the Nimbus-7 SMMR data. It is shown that this is most likely the result of the wind-induced micro-roughness of the ice surface. (Auth.)

46-504
Glaciological studies at Siple Station (Antarctica): potential ice-core paleoclimatic record.
Mosley-Thompson, E., et al. *Journal of glaciology*, 1991, 37(125), p.11-22, 36 refs.
Ice cores, Drill core analysis, Isotope analysis, Paleoclimatology, Ice dating, Climatic changes, Surface temperature, Deuterium oxide ice, Seasonal variations, Atmospheric composition, Antarctica—Siple Station.
The quality and utility of the records of oxygen-isotopic abundances, dust concentrations and anionic concentrations preserved in the ice at Siple Station are assessed from four shallow (20 m) cores. The combination of high accumulation (0.56 m a w e) and low mean annual temperature (-24 C) preserves the prominent seasonal variations in (delta)O-18 which are very spatially coherent. Sulfate concentrations vary seasonally and, in conjunction with (delta)O-18, will allow accurate dating of deeper cores from Siple Station. The concentrations of insoluble dust are the lowest measured in Antarctica, making Siple Station an excellent location to examine large increases in atmospheric turbidity. The seasonal variations and annual fluxes of the anions are examined for the last two decades (1966-85) with regard to probable sources. An unusually high sulfate flux in 1976 may reflect the Feb. 1975 eruption of Mount Ngauruhoe, New Zealand. No annual signal in nitrate concentration is confirmed and no unusually high nitrate fluxes support the suggestion of nitrate production by large solar flares. However, nitrate flux is higher for the latter half of the 1970s and early 1980s, possibly reflecting the recent loss of stratospheric ozone. Finally, comparison of the (delta)O-18 record with available surface-temperature data (1957-85) reveals that multi-year trends along the western coast of the Antarctic Peninsula are recorded at Siple. More importantly, comparison with areally weighted temperature reconstructions suggests that the (delta)O-18 record may reflect larger-scale, persistent trends in the high southern latitudes. The strong spatial coherence of the preserved records, the potential for accurate dating, and possible relevance to larger-scale processes make Siple Station an excellent site for paleoenvironmental reconstruction from ice cores. (Auth.)

46-505
Equilibrium oxygen- and hydrogen-isotope fractionation between ice and water.
Lehmann, M., et al. *Journal of glaciology*, 1991, 37(125), p.23-26, 12 refs.
Siegenthaler, U.
Ice water interface, Isotope analysis, Ice growth, Freezing rate, Oxygen isotopes, Laboratory techniques, Water chemistry, Hydrologic cycle.

46-506
Potential effects of subglacial water-pressure fluctuations on quarrying.
Iverson, N.R., *Journal of glaciology*, 1991, 37(125), p.27-36, 38 refs.
Glacier beds, Basal sliding, Water pressure, Subglacial drainage, Fracture zones, Subglacial observations, Rock excavation, Ice solid interface, Glacial hydrology.

46-507
Borehole temperatures at the Colle Gnifetti core-drilling site (Monte Rosa, Swiss Alps).
Haeberli, W., et al, *Journal of glaciology*, 1991, 37(125), p.37-46, 46 refs.
Funk, M.
Ice cores, Boreholes, Temperature measurement, Global warming, Ice temperature, Air temperature, Glacier heat balance, Firn, Air pollution, Temperature variations.

46-508
Freezing of water drops on a cold surface.
Walford, M.E.R., et al, *Journal of glaciology*, 1991, 37(125), p.47-50, 1 ref.
Hargreaves, D.M., Stuart-Smith, S., Lowson, M.
Drops (liquids), Shear strength, Freezing, Ice solid interface, Ice adhesion, Ice removal, Aircraft icing, Metals, Low temperature tests.

46-509
Use of tiltmeters to study the dynamics of antarctic ice-shelf grounding lines.
Smith, A.M., *Journal of glaciology*, 1991, 37(125), p.51-58, 14 refs.
Ice shelves, Ice deformation, Grounded ice, Ice cover thickness, Altitude, Geophysical surveys, Ice models, Tidal currents, Sea level, Orientation, Antarctica—Ronne Ice Shelf.
New tiltmeter data are presented from Doake Ice Rumples on Ronne Ice Shelf. Five sites which showed a tidal ice-shelf flexure have been analyzed using an elastic beam model to investigate the variation of flexure amplitude with distance from the grounding line. An earlier study on Rutford Ice Stream which also used an elastic model required an ice thickness much less than that observed. Reworking the Rutford Ice Stream data suggests that this greatly reduced ice thickness is not required, given the current sparse data coverage. The elastic model is used to improve the estimated grounding-line position on Rutford Ice Stream. Some of the difficulties in modeling ice-shelf flexure and locating grounding lines are discussed. (Auth.)

46-510
Composition of the englacial and subglacial component in bulk meltwaters draining the Gornergletscher, Switzerland.
Tranter, M., et al, *Journal of glaciology*, 1991, 37(125), p.59-66, 15 refs.
Raiswell, R.
Glacial hydrology, Water chemistry, Glacier melting, Weathering, Subglacial drainage, Hydrography, Meltwater, Seasonal ablation, Chemical analysis, Diurnal variations.

46-511
Deforming-bed origin for southern Laurentide till sheets?.
Alley, R.B., *Journal of glaciology*, 1991, 37(125), p.67-76, Refs. p.74-76.
Glacial deposits, Pleistocene, Sediment transport, Basal sliding, Glacier beds, Subglacial observations, Glaciation, Deformation.

46-512
Three-dimensional theory of wind pumping.
Clarke, G.K.C., et al, *Journal of glaciology*, 1991, 37(125), p.89-96, 13 refs.
Waddington, E.D.
Ice air interface, Firn, Ice temperature, Air temperature, Wind factors, Turbulent diffusion, Microclimatology, Analysis (mathematics), Air flow, Paleoclimatology, Heat transfer.

46-513
Glacier dynamics in the Susitna River basin, Alaska, U.S.A.
Clarke, T.S., *Journal of glaciology*, 1991, 37(125), p.97-106, 35 refs.
Glacier mass balance, Glacier surges, Glacier oscillation, Glacier flow, Seasonal variations, Moraines, Velocity.

46-514
Measuring the dihedral angle of water at a grain boundary in ice by an optical diffraction method.
Walford, M.E.R., et al, *Journal of glaciology*, 1991, 37(125), p.107-112, 8 refs.
Nye, J.F.
Ice water interface, Ice crystals, Refraction, Light transmission, Surface energy, Optical phenomena, Interfacial tension, Measurement.

46-515
Variations in grain-size distribution of suspended sediment in a glacial meltwater stream, Austre Okstindbreen, Norway.
Karlsen, E., *Journal of glaciology*, 1991, 37(125), p.113-119, 27 refs.
Glacier melting, Meltwater, Suspended sediments, Particle size distribution, Grain size, Sediment transport, Glacial deposits, Sampling, Periodic variations, Norway.

46-516
Analysis of glacier facies using satellite techniques.
Williams, R.S., Jr., et al, *Journal of glaciology*, 1991, 37(125), p.120-128, 35 refs.
Hall, D.K., Benson, C.S.
Glacier surveys, Glacier surfaces, Sensor mapping, Glacier mass balance, Grain size, Snow line, Spaceborne photography, LANDSAT, Resolution, Image processing.

46-517
Large-scale statistical study of Scanning Multichannel Microwave Radiometer (SMMR) data over Antarctica.
Fily, M., et al, *Journal of glaciology*, 1991, 37(125), p.129-139, 31 refs.
Benoist, J.P.
Ice sheets, Topographic features, Firn, Snow accumulation, Radiometry, Brightness, Remote sensing, Surface temperature, Statistical analysis.
Scanning Multichannel Microwave Radiometer (SMMR) data over Antarctica have been statistically analyzed for four different periods of 1 year (1981) and compared to geophysical data such as surface temperature, snow-accumulation rate and topography. The spatial variations of the microwave signature are stable with time. Although the ten channels are highly correlated, principal-component analysis reveals the importance of polarization and frequency. The difference between brightness temperatures at the two polarizations is found to be dependent on the atmospheric water-vapor fluxes over the ice sheet, which modify the temperature-accumulation ratio and therefore the snow stratification. The brightness-temperature gradient with frequency is related to the topography of the central plateau area. A more important subsidence over diverging areas could explain the different structure of the accumulated snow. (Auth. mod.)

46-518
New precipitation and accumulation maps for Greenland.
Ohmura, A., et al, *Journal of glaciology*, 1991, 37(125), p.140-148, 33 refs.
Reeh, N.
Ice sheets, Precipitation (meteorology), Snow accumulation, Topographic effects, Meteorological data, Statistical analysis, Glacier mass balance, Greenland.

46-519
Steady-state characteristics of the Greenland ice sheet under different climates.
Letréguilly, A., et al, *Journal of glaciology*, 1991, 37(125), p.149-157, 17 refs.
Huybrechts, P., Reeh, N.
Glacier ablation, Glacier mass balance, Climatic factors, Global warming, Glacier formation, Ice sheets, Ice models, Bedrock, Periodic variations, Greenland.

46-520
Geometric and thermal evolution of a surge-type glacier in its quiescent state: Trapridge Glacier, Yukon Territory, Canada, 1969-89.
Clarke, G.K.C., et al, *Journal of glaciology*, 1991, 37(125), p.158-169, 41 refs.
Blake, E.W.
Glacier oscillation, Glacier heat balance, Ice temperature, Glacier flow, Thermal regime, Glacier surges, Basal sliding, Surface structure.

46-521
Butyl acetate, an alternative drilling fluid for deep ice-coring projects.
Gosink, T.A., et al, *Journal of glaciology*, 1991, 37(125), p.170-176, 18 refs.
Ice cores, Drilling fluids, Chemical composition, Physical properties, Viscosity, Drilling, Temperature effects, Environmental impact, Cold weather performance.

46-522
NMR imaging of salt-water ice.
Edelstein, W.A., et al, *Journal of glaciology*, 1991, 37(125), p.177-180, 7 refs.
Schulson, E.M.
Salt ice, Imaging, Nuclear magnetic resonance, Ice microstructure, Laboratory techniques, Temperature effects.

46-523
Iceberg tool marks: an example from Heinabergsjokull, southeast Iceland.
Bennett, M.R., et al. *Journal of glaciology*, 1991, 37(125), p.181-183, 13 refs.
Bullard, J.E.
Glacial lakes, Lake bursts, Icebergs, Ice scoring, Ice push, Sedimentation, Lacustrine deposits.

46-524
Glaciological reconnaissance on the Loonney ice cap, Alexandra Land, Franz Josef Land.
Sin'kevich, S.A., et al. *Journal of glaciology*, 1991, 37(125), p.183-185, 9 refs.
Korolev, P.A., Smirnov, K.E.
Ice sheets, Glacier surveys, Glaciation, Firn, Drill core analysis, Ice temperature, Glaciology, USSR—Franz Josef Land.

46-525
Reply to "Comments on: '6000-year climate records in an ice core from the Höghetta ice dome in northern Spitsbergen'".
Fujii, Y., *Journal of glaciology*, 1991, 37(125), p.186-188, 8 refs. For article under comment see 45-1549.
Paleoclimatology, Ice cores, Drill core analysis, Age determination, Isotope analysis.

46-526
Subglacial water and sediment samplers.
Blake, E.W., et al. *Journal of glaciology*, 1991, 37(125), p.188-190, 3 refs.
Clarke, G.K.C.
Samplers, Design, Subglacial observations, Borehole instruments, Subglacial drainage, Performance.

46-527
Engineering-geocryological survey methods; collected scientific papers. [Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov],
Mel'nikov, E.S., ed, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, 177p., In Russian. For individual papers see 46-528 through 46-543.
Engineering geology, Geocryology, Mapping, Geological surveys, Geophysical surveys, Frozen rocks, Ecology, Quaternary deposits, Cryogenic soils, Natural resources.

46-528
Basic methodology of ecological-geological mapping. [Metodologicheskie osnovy ekologi-geologicheskogo kartografirovaniia],
Mel'nikov, E.S., Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.6-11, In Russian. 5 refs.
Mapping, Ecology, Geocryology, Geology.

46-529
Subject of engineering-geocryological study during the general development of a territory. [Ob"ekt inzhenerno-geokriologiche skogo izucheniia pri obshchem osvoenii territorii],
Shur, IU.L., Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.12-19, In Russian. 2 refs.
Engineering geology, Geocryology, Seasonal freeze thaw, Thaw depth, Active layer, Analysis (mathematics).

46-530
Subdivision of surface deposits based on characteristics of the composition and properties of rocks in an engineering-geological survey. [Raschlenenie poverkhnostnykh otlozhenii po kompleksu pokazateleĭ sostava i svoĭstv porod pri inzhenerno-geologicheskoĭ s"emki],
Shirshikova, A.S., Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.20-30, In Russian. 4 refs.
Engineering geology, Geocryology, Rock properties, Geological surveys, Quaternary deposits.

46-531
Using the full-scale analogies method for analyzing the regime of engineering-geocryological conditions of the designed gas pipeline route in Yamal. [Ispol'zovanie metoda naturnykh analogiĭ dlia otsenki rezhima inzhenerno-geokriologicheskikh usloviĭ proektiruemoĭ trassy gazoprovoda na IAmale],
Pavlov, A.V., et al, Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.31-40, In Russian. 3 refs.
Dubrovin, V.A., IAstreba, N.V., Ukraintseva, N.G.
Engineering geology, Geocryology, Gas pipelines.

46-532
Characteristics of using aerial photographic materials for engineering-geocryological mapping of the Leno-Vilyuysk gas and oil-bearing province. [Osobennosti ispol'zovaniia materialov aerofotos"emki dlia inzhenerno-geokriologicheskogo kartografirovaniia Leno-Viliuĭskoĭ gazoneftenosnoĭ provintsii],
Stashenko, A.I., Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.40-48, In Russian. 1 ref.
Aerial surveys, Mapping, Engineering geology, Geocryology.

46-533
Cryomorphogenesis of the subarctic lowlands of Western Siberia (towards a basis for a cryomorphogenetic analysis of the relief). [Kriomorfogenez subarkticheskikh nizmennostei Zapadnoĭ Sibiri (k osnovam kriomorfogeneticheskogo analiza rel'efa)],
Lovchuk, V.V., Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.48-67, In Russian. 7 refs.
Geocryology, Geomorphology, Subarctic landscapes.

46-534
Cryogenic-structural analysis in an engineering-geocryological survey. [Merzlotno-strukturnyĭ analiz pri inzhenerno-geokriologicheskoĭ s"emke],
Gravis, G.F., Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.67-82, In Russian. 9 refs.
Geological surveys, Engineering geology, Geocryology, Structural analysis.

46-535
Studying the iciness of rocks in medium- and large-scale engineering-geological surveys in central Yakutia. [Izuchenie l'distosti porod pri sredne- i krupnomasshtabnykh inzhenerno-geokriologicheskikh s"emkakh v Tsentral'noĭ IAkutii],
Konchenko, L.A., Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.82-93, In Russian. 13 refs.
Engineering geology, Geological surveys, Geocryology, Frozen rocks.

46-536
Characteristics of engineering-cryogeological investigations in regions of high ice content, syncryogenic frozen rocks. [Osobennosti inzhenerno-geokriologicheskikh issledovaniĭ v raĭonakh razvitiia vysokol'distykh sinkriogennykh merzlykh porod],
Kanevskiĭ, M.Z., et al, Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.94-100, In Russian. 5 refs.
Maksimov, V.V.
Frozen rocks, Engineering geology, Geocryology, Geological surveys.

46-537
Structure and properties of technogenic soils. [Stroenie i svoĭstva tekhnogennykh gruntov],
Samylin, I.A., Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.100-111, In Russian. 2 refs.
Tailings, Cryogenic soils, Soil structure, Geocryology, Lithology.

46-538
Field study of physical-mechanical properties of frozen and thawing rocks. [Polevoe izuchenie fiziko-mekhanicheskikh svoĭstv merzlykh i ottaivaiushchikh porod],
Vasil'ev, A.A., Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.111-118, In Russian. 5 refs.
Frozen rocks, Frozen rock temperature, Mechanical properties, Physical properties, Active layer.

46-539
Experiment in the use of the isotopic-oxygen method of studying ground ice while conducting an engineering-geocryological survey. [Opyt primeneniia izotopno-kislorodnogo metoda izucheniia podzemnykh l'dov pri provedenii inzhenerno-geokriologicheskoĭ s"emki],
Tarasov, A.M., Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.118-135, In Russian. 10 refs.
Ground ice, Geological surveys, Engineering geology, Geocryology, Oxygen isotopes, Isotope analysis.

46-540
Studying the salinity of blanket deposits in central Yakutia during engineering-geological mapping. [Izuchenie zasolennosti pokrovnykh otlozhenii Tsentral'noĭ IAkutii pri inzhenerno-geologicheskom kartografirovanii],
Ponomareva, O.E., Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.133-139, In Russian. 7 refs.
Engineering geology, Geocryology, Salinity, Saline soils, Mapping, Alluvium.

46-541
Studying sublacustrine taliks in the transpolar region of Western Siberia using geophysical methods. [Izuchenie podozernykh talikov v Zapoliarnom raĭone zapadnoĭ Sibiri geofizicheskimi metodami],
Pugach, V.B., et al, Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.139-143, In Russian. 2 refs.
Skvortsov, A.G., Timofeev, V.M., Tsarev, A.M.
Taliks beneath lakes, Geophysical surveys, Geocryology.

46-542
Effect of agricultural activities on engineering-geocryological conditions of test areas in central regions of the Magadan territory (in the example of the Seymchan-Buyundinsk basin). [Vliianie sel'skokhoziaĭstvennoĭ deiatel'nosti na inzhenerno-geokriologicheskie usloviia poligonal'nykh urochishch v tsentral'nykh raĭonakh Magadanskoĭ oblasti (na primere Seimchano-Buiundinskoĭ vpadiny)],
Basistyĭ, V.A., Metody inzhenerno-geokriologicheskoĭ s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov, Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoĭ geologii, 1990, p.143-157, In Russian. 8 refs.
Engineering geology, Geocryology, Agriculture, Temperature distribution, Soil temperature, Snow cover effect.

46-543
Characteristics of a detailed (1:2000-1:10,000) engineering-geocryological mapping of deposits of mineral resources in northern Yakutia. [Osobennosti detal'nogo (1:2000-1:10,000) inzhenerno-geokriologicheskogo kartografirovaniia mestorozhdenii poleznykh iskopaemykh Severnoi lAkutii],
Zaikanov, V.G., Metody inzhenerno-geokriologicheskoi s"emki; sbornik nauchnykh trudov (Engineering-geocryological survey methods; collected scientific papers). Edited by E.S. Mel'nikov. Moscow, Vsesoiuzn. nauchn.-issled. inst. gidrogeologii i inzhenernoi geologii, 1990, p.157-169, In Russian. 7 refs.
Engineering geology, Geocryology, Mapping, Minerals, Natural resources.

46-544
Glacio-morphological and paleoglaciological models. [Glazialmorphologische und Palaeoglaciologische Modelle],
Haeberli, W., *Geographisches Institut, Freiburg. Berichte und Forschungen*, 1991, Vol.3, Fachtagung der Schweizerischen Geomorphologischen Gesellschaft, Fribourg, CH, June 22-23, 1990. Modelle in der Geomorphologie—Beispiele aus der Schweiz. Edited by M. Monbaron and W. Haeberli, p.7-19, In German with English summary. 15 refs.
Paleoclimatology, Geomorphology, Landforms, Glacial geology, Climatic factors, Models, Glacier friction, Glacier erosion.

46-545
Modelling of debris flows. [Modellierung von Murgaengen],
Rickenmann, D., *Geographisches Institut, Freiburg. Berichte und Forschungen*, 1991, Vol.3, Fachtagung der Schweizerischen Geomorphologischen Gesellschaft, Fribourg, CH, June 22-23, 1990. Modelle in der Geomorphologie—Beispiele aus der Schweiz. Edited by M. Monbaron and W. Haeberli, p.33-45, In German with English summary. 21 refs.
Mountains, Sediment transport, Slope processes, Grain size, Avalanche mechanics, Mathematical models, Sliding.

46-546
Location maps and list of U.S. Geological Survey Reports on water in Alaska—1950 to 1990.
Snyder, E.F., comp. *U.S. Geological Survey. Open-file report*, 1991, 91-69, 44p.
Bibliographies, Geological surveys, Geological maps, Water supply, United States—Alaska.

46-547
Structural investigations of snow—a comparison of different parameter sets.
Good, W., Pattern recognition in practice. Proceedings of an international workshop, Amsterdam, Netherlands, May 21-23, 1980. Edited by E.S. Gelsema and L.N. Kanal, Amsterdam, North-Holland Publishing Company, 1980, p.161-170, 173-174, Includes discussion. 7 refs.
Snow crystal structure, Microstructure, Thin sections, Photographic techniques, Image processing, Laboratory techniques, Resolution, Classifications, Statistical analysis, Data processing.

46-548
Report on the Glacier Research Workshop, February 5-7, 1991, Eagle River, Alaska.
Sturm, M., et al, MP 2958, National Park Service, 1991, 16p., 11 refs.
Taylor, D., Benson, C., Nelson, G.
Glacier surveys, Meetings, Research projects, Organizations, Monitors, Climatic changes, Glacier oscillation.

46-549
Glacier monitoring: international perspectives.
Ommanney, C.S.L., *Environment Canada. National Hydrology Research Institute. Contribution*, Feb. 1990, No.91006, 26p. + append., 5 refs. Presented at the National Park Service Workshop on Glacier Monitoring, Eagle River, AK, Feb. 5-6, 1991.
Glacier surveys, Glaciology, Organizations, Research projects, International cooperation, Glacier oscillation, Water supply, Monitors, Periodic variations.

46-550
Evaluation of advanced industrial materials for use in navigation buoy design.
Tynes, G.A., et al, *Transport Canada. Publication*, Jan. 1991, TP 10774E, 44p. + appends., 32 refs.
Crick, D.
Ice navigation, Floating structures, Manufacturing, Design, Performance, Materials, Maintenance, Monitors.

46-551
Glacial isostasy, sea-level and mantle rheology.
Sabadini, R., ed, Dordrecht, Kluwer Academic Publishers, 1990, 708p., Proceedings of the NATO Advanced Research Workshop on Glacial Isostasy, Sea-Level and Mantle Rheology, Erice, Italy, July 27-Aug. 4, 1990. NATO ASI Series. Series C: Mathematical and physical sciences, Vol.334. For selected papers see 46-552 through 46-564.
Lambeck, K., ed. Boschi, E., ed.
Isostasy, Rheology, Sea level, Ice loads, Viscosity, Viscoelasticity, Ice sheets, Ice models, Pleistocene, Paleoclimatology.

46-552
Rheology of mantle and lithosphere inferred from post-glacial uplift in Fennoscandia.
Fjeldskaar, W., et al, Glacial isostasy, sea-level and mantle rheology. Edited by R. Sabadini, K. Lambeck, E. Boschi, Dordrecht, Kluwer Academic Publishers, 1990, p.1-19, 28 refs.
Cathles, L.
Rheology, Models, Ice loads, Viscoelasticity, Viscosity, Analysis (mathematics).

46-553
Deep continental roots: the effects of lateral variations of viscosity on post-glacial rebound.
Gasperini, P., et al, Glacial isostasy, sea-level and mantle rheology. Edited by R. Sabadini, K. Lambeck, E. Boschi, Dordrecht, Kluwer Academic Publishers, 1990, p.21-32, 14 refs.
Sabadini, R., Yuen, D.A.
Viscosity, Rheology, Ice loads, Ice sheets.

46-554
Model for Devensian and Flandrian glacial rebound and sea-level change in Scotland.
Lambeck, K., Glacial isostasy, sea-level and mantle rheology. Edited by R. Sabadini, K. Lambeck, E. Boschi, Dordrecht, Kluwer Academic Publishers, 1990, p.33-61, 44 refs.
Ice models, Sea level, Ice sheets, Rheology, Glaciation.

46-555
Radial resolution in the inference of mantle viscosity from observations of glacial isostatic adjustment.
Mitrovica, J.X., et al, Glacial isostasy, sea-level and mantle rheology. Edited by R. Sabadini, K. Lambeck, E. Boschi, Dordrecht, Kluwer Academic Publishers, 1990, p.63-78, 19 refs.
Peltier, W.R.
Sea level, Ice loads, Ice models, Analysis (mathematics), Isostasy, Viscosity, Viscoelasticity.

46-556
Late Pleistocene and Holocene sea-level change; evidence for lateral mantle viscosity structure?.
Nakada, M., et al, Glacial isostasy, sea-level and mantle rheology. Edited by R. Sabadini, K. Lambeck, E. Boschi, Dordrecht, Kluwer Academic Publishers, 1990, p.79-94, 31 refs.
Lambeck, K.
Sea level, Pleistocene, Viscosity, Ice loads, Ice models, Ice sheets.

46-557
ICE-3G model of late Pleistocene deglaciation: construction, verification, and applications.
Peltier, W.R., Glacial isostasy, sea-level and mantle rheology. Edited by R. Sabadini, K. Lambeck, E. Boschi, Dordrecht, Kluwer Academic Publishers, 1990, p.95-119, 40 refs.
Ice models, Pleistocene, Sea level, Viscoelasticity, Isostasy.

46-558
Dynamical influences of a hard transition zone on post-glacial uplifts and rotational signatures.
Spada, G., et al, Glacial isostasy, sea-level and mantle rheology. Edited by R. Sabadini, K. Lambeck, E. Boschi, Dordrecht, Kluwer Academic Publishers, 1990, p.121-141, 43 refs.
Sabadini, R., Yuen, D.A.
Ice sheets, Viscoelasticity, Models, Rheology, Ice loads, Mathematical models.

46-559
Relative sea levels, northeastern margin of the Laurentide ice sheet, on timescales of 10 exp 3 and 10 exp 2 A.
Andrews, J.T., Glacial isostasy, sea-level and mantle rheology. Edited by R. Sabadini, K. Lambeck, E. Boschi, Dordrecht, Kluwer Academic Publishers, 1990, p.143-163, 61 refs.
Sea level, Ice sheets, Paleoclimatology, Glaciation, Radioactive age determination.

46-560
Changing ice loads on the Earth's surface during the last glaciation cycle.
Fastook, J.L., et al, Glacial isostasy, sea-level and mantle rheology. Edited by R. Sabadini, K. Lambeck, E. Boschi, Dordrecht, Kluwer Academic Publishers, 1990, p.165-201, 27 refs.
Hughes, T.J.
Ice loads, Ice sheets, Mathematical models, Ice volume, Glaciation, Isostasy
The last (Wisconsin-Weichselian) glaciation cycle occurred from 120,000 to 6000 years ago. The authors have simulated advance and retreat of ice sheets for this cycle using the map-plane solution of a time-dependent, finite-element gridpoint computer model. Two square grids (one centered on each pole) were employed, with gridpoints spaced 100 km apart. Input at each gridpoint included constants in the flow and sliding laws of ice, bed topography, fractions of bed over which sliding dominates flow, degree of glacioisostasy (isostatic equilibrium was assumed), and surface accumulation or ablation rates. Output at each gridpoint includes ice elevation, ice thickness, and ice velocity vectors. Time steps for input and output are variable. In this experiment, snowline slope was held constant and snowline elevation was lowered sinusoidally about 1000 m over 20,000 years, held constant for 60,000 years, and raised sinusoidally over 20,000 years. Advance and retreat of ice sheets are presented in eleven time steps for North American and Eurasian Ice Sheets, and three time steps for the Antarctic Ice Sheet. Changes over time of total ice volume and ice volume contributing to sea level are computed. (Auth.)

46-561
Global warming expected from increase of greenhouse gases: a forcing for sea level change.
Visconti, G., Glacial isostasy, sea-level and mantle rheology. Edited by R. Sabadini, K. Lambeck, E. Boschi, Dordrecht, Kluwer Academic Publishers, 1990, p.203-212, 23 refs.
Ice sheets, Global warming, Sea level, Climatic changes, Water balance, Land ice, Snow accumulation, Glaciers.
Global warming and related climatic changes expected from increase of the concentration of greenhouse gases may produce a redistribution of ice and water reservoir and consequently will affect the sea level. Direct warming may also affect sea level through thermal expansion. In this paper the model calculations on future sea level changes and interpretation of past data are reviewed. Changes in the volume and mass balance of the antarctic ice sheet are discussed. Data on global water mass distribution, as well as evaporation, precipitation and runoff for main water storage also includes Antarctica. The most interesting results so far seem to indicate that sea level rise has a regional character with different regions showing quite different trends. These model calculations however show some limitation because they do not consider the changes in ocean circulation produced by changes in the intensity of the wind stress field or salinity due to the changing climate. These changes may be of the same magnitude as those produced by thermal expansion or melting of mountain glaciers, and may appear on a relatively short time scale (10 years). The regional dependence of the sea level rise and the short time scale associated with circulation changes may introduce an additional noise source in analyzing past and future data. (Auth. mod.)

46-562
Study of inferred patterns of Holocene sea-level change from Atlantic and other European coastal margins as a means of testing models of earth crustal behaviour.
Devoy, R.J.N., Glacial isostasy, sea-level and mantle rheology. Edited by R. Sabadini, K. Lambeck, E. Boschi, Dordrecht, Kluwer Academic Publishers, 1990, p.213-236, 71 refs.
Models, Sea level, Rheology, Isostasy, Ice loads.

46-563
Secular sea-level change.
Nakiboglu, S.M., et al, Glacial isostasy, sea-level and mantle rheology. Edited by R. Sabadini, K. Lambeck, E. Boschi, Dordrecht, Kluwer Academic Publishers, 1990, p.237-258, 32 refs.
Lambeck, K.
Sea level, Mountain glaciers, Glacier melting, Tides, Tectonics, Analysis (mathematics).
Sea-level change as recorded by tide gauges exhibits a complex spatial and temporal variability for a number of reasons, including tectonic movements of changes in ocean volume and the adjustment of the crust to major Late Pleistocene deglaciation, and to recent mountain glacier and antarctic melting. Tide gauge records have been analyzed by least squares regression for secular trends and mean regional trends have been estimated for 10 deg x 10 deg areas. These have been expanded into a surface spherical harmonic series, yielding the global long wavelength pattern of sea-level change. The low degree terms in this expansion represent a combination of tectonic change and local or regional changes in sea-level. The eustatic rise, reflecting a change in water volume and corresponding to the zero degree harmonic, is estimated as 1.15 + -0.38 mm/year. The first degree terms in the expansion are negligibly small, indicating that there is no significant shift in the center of mass of the ocean relative to the solid Earth. Of the second degree terms only the zonal coefficient is significant with an equatorial sea-level rise and a polar sea-level drop. The contributions from recent changes in mountain glacier volumes and postglacial

rebound to the spatial variability are significant but not for the very low degree terms. The separation of these contributions from the observed change yields a globally averaged secular steric change of about 0.5 mm/year, but the uncertainties are large. The mainly zonal geometry of the steric change implies greater thermal expansion effects in low latitudes than in high latitudes. (Auth.)

46-564
Mantle viscosity: what are we exactly looking for.
Lliboutry, L.A., Glacial isostasy, sea-level and mantle rheology. Edited by R. Sabadini, K. Lambeck, E. Boschi, Dordrecht, Kluwer Academic Publishers, 1990, p.321-341, 18 refs.
Rheology, Viscosity, Ice creep, Isostasy, Analysis (mathematics).

46-565
Ozone profiles at McMurdo Station, Antarctica, the austral spring of 1990.
Deshler, T., et al, *Geophysical research letters*, Apr. 1991, 18(4), p.657-660, 8 refs.
Hofmann, D.J.
Ozone, Atmospheric composition, Atmospheric circulation, Antarctica—McMurdo Station.
Vertical profiles of ozone and temperature were measured on 40 occasions during the austral spring of 1990 at McMurdo Station and once again near record levels of ozone depletion were observed. Total ozone decreased from 260 DU in late Aug. to its minimum value of 145 DU on Oct. 9, when the ozonesonde was at its lower detection limit from 15 to 16.5 km. Ozone reductions were observed almost exclusively between 12 and 20 km, with a half life of 20 days. This is similar to previous years. Although McMurdo was within the polar vortex for most of the period, there were several occasions when the edge of the vortex was over McMurdo. During these periods, ozone above 20 km approximately doubled, but below 20 km remained relatively unchanged. (Auth.)

46-566
1990 antarctic ozone hole as observed by TOMS.
Newman, P.A., et al, *Geophysical research letters*, Apr. 1991, 18(4), p.661-664, 18 refs.
Stolarski, R.S., Schoeberl, M.R., McPeters, R., Krueger, A.
Ozone, Stratosphere, Atmospheric composition.
The 1990 antarctic ozone hole matched the record 1987 ozone hole in depth, duration, and area. During the formation phase of the hole (Aug.) total ozone values were the lowest yet recorded. The decline rate approximately matched the record 1987 decline, and reached a minimum of 125 Dobson Units on Oct. 4, 1990. October total ozone averages were marginally higher than in 1987. As during 1987, the 1990 total ozone values within the hole slowly and steadily increased during the mid-Oct. through Nov. period. The ozone hole breakup was the latest yet recorded (early Dec.), with low ozone values persisting over the pole through Dec., setting a record low for Dec. average polar ozone. Temperatures were near average during the early spring, but were below normal for the late spring. Temperatures in the early spring of 1990 were substantially warmer than those observed in the early spring of 1987. (Auth.)

46-567
NO2 overnight decay and layer height at Halley Bay, Antarctica.
Keys, J.G., et al, *Geophysical research letters*, Apr. 1991, 18(4), p.665-668, 15 refs.
Gardiner, B.G.
Ozone, Atmospheric circulation, Atmospheric composition.
Ground-based measurements of stratospheric slant column NO2 amounts made at Halley Bay in 1987 are compared with ozone and temperature profiles from balloon-borne sondes. Sunrise-to-sunset (am/pm) ratios of NO2 have been calculated in autumn and spring by using the sonde data in conjunction with a simple photochemical model for the conversion of NO2 to N2O5. These calculations can be reconciled with the spectrometric measurements of column NO2, provided that the bulk of the NO2 layer is assumed to lie at a height of about 25 km. The small amounts of NO2 that are present in the stratospheric column during the first 6 weeks of spring are therefore confined to altitudes above the ozone depletion region. Slow recovery of the NO2 column in spring compared with the rate of its decline in autumn indicates slow photolysis of depleted levels of N2O5 inside the polar vortex. (Auth.)

46-568
CHEOPS III: an ozone research campaign in the arctic winter stratosphere 1989/90.
Pommereau, J.P., et al, *Geophysical research letters*, Apr. 1991, 18(4), p.750-762, 12 refs.
Schmidt, U.
Research projects, Ozone, Stratosphere.

46-569
In situ measurements of carbon dioxide in the winter arctic vortex and at midlatitudes: an indicator of the "age" of stratospheric air.
Schmidt, U., et al, *Geophysical research letters*, Apr. 1991, 18(4), p.763-766, 12 refs.
Khedim, A.
Stratosphere, Carbon dioxide, Atmospheric composition.

46-570
Profile observations of long-lived trace gases in the arctic vortex.
Schmidt, U., et al, *Geophysical research letters*, Apr. 1991, 18(4), p.767-770, 11 refs.
Atmospheric composition, Stratosphere, Ozone, Trace elements.

46-571
Stratospheric water vapor measurements during CHEOPS-3.
Ovarlez, J., *Geophysical research letters*, Apr. 1991, 18(4), p.771-774, 18 refs.
Stratosphere, Water vapor, Hygrometers, Ozone.

46-572
Observations of PSCs in polarized light.
Herman, M., et al, *Geophysical research letters*, Apr. 1991, 18(4), p.775-778, 12 refs.
Santer, R., Gonzales, L., Lecomte, P., Verwaerde, C.
Stratosphere, Clouds (meteorology), Aerosols, Ozone.

46-573
Identification of polar stratospheric clouds from the ground by visible spectrometry.
Sarkissian, A., et al, *Geophysical research letters*, Apr. 1991, 18(4), p.779-782, 12 refs.
Pommereau, J.P., Goutail, F.
Ozone, Clouds (meteorology), Spectrometry, Spectrometry.

46-574
Column amounts of trace gases derived from ground-based measurements with MIPAS during CHEOPS III.
Adrian, G.P., et al, *Geophysical research letters*, Apr. 1991, 18(4), p.783-786, 18 refs.
Ozone, Atmospheric composition, Stratosphere, Spectrometry, Spectrometry.

46-575
Ground-based UV-VIS spectroscopy: diurnal OClO-profiles during January 1990 above Söndre Strömfjord, Greenland.
Perner, D., et al, *Geophysical research letters*, Apr. 1991, 18(4), p.787-790, 12 refs.
Klüpfel, T., Parchatka, U., Roth, A., Jörgensen, T.
Stratosphere, Atmospheric composition, Atmospheric circulation, Greenland.

46-576
Depletion of arctic ozone in the winter 1990.
Koike, M., et al, *Geophysical research letters*, Apr. 1991, 18(4), p.791-794, 11 refs.
Ozone, Atmospheric circulation, Stratosphere.

46-577
Insulation materials: testing and application, 2nd volume.
Graves, R.S., ed, ASTM Special technical publication, STP 1116, Philadelphia, PA, American Society for Testing and Materials, 1991, p.654p., Refs. passim. Presented at the Symposium on Insulation Materials: Testing and Applications, Gatlinburg, TN, Oct. 10-12, 1991. For selected papers see 46-578 through 46-582.
Wysocki, D.C., ed.
Thermal insulation, Roofs, Cold weather tests, Walls, Thermal conductivity.

46-578
Effect of natural convective air flows in residential attics on ceiling insulating materials.
Rose, W.B., et al, ASTM Special technical publication, STP 1116. Insulation materials: testing and application, 2nd volume. Edited by R.S. Graves and D.C. Wysocki, Philadelphia, PA, American Society for Testing and Materials, 1991, p.263-274, 6 refs.
McCaa, D.J.
Thermal insulation, Roofs, Cold weather tests, Air flow, Convection.

46-579
Thermal performance of one loose-fill fiberglass attic insulation.
Wilkes, K.E., et al, ASTM Special technical publication, STP 1116. Insulation materials: testing and application, 2nd volume. Edited by R.S. Graves and D.C. Wysocki, Philadelphia, PA, American Society for Testing and Materials, 1991, p.275-291, 14 refs.
Wendt, R.L., Delmas, A., Childs, P.W.
Thermal insulation, Roofs, Cold weather tests.

46-580
Effect of exterior insulating sheathing on wall moisture.
Tsongas, G.A., ASTM Special technical publication, STP 1116. Insulation materials: testing and application, 2nd volume. Edited by R.S. Graves and D.C. Wysocki, Philadelphia, PA, American Society for Testing and Materials, 1991, p.401-414, 7 refs.
Thermal insulation, Walls, Moisture transfer, Cold weather performance.

46-581
Automated low-temperature guarded hot plate for measuring apparent conductivity.
Smith, D.R., et al, ASTM Special technical publication, STP 1116. Insulation materials: testing and application, 2nd volume. Edited by R.S. Graves and D.C. Wysocki, Philadelphia, PA, American Society for Testing and Materials, 1991, p.479-501, 6 refs.
Dube, W.P., Filla, B.J.
Thermal insulation, Thermal conductivity, Low temperature tests, Measuring instruments.

46-582
Tensile testing of EIFS laminas.
Flanders, S.N., et al, MP 2959, ASTM Special technical publication, STP 1116. Insulation materials: testing and application, 2nd volume. Edited by R.S. Graves and D.C. Wysocki, Philadelphia, PA, American Society for Testing and Materials, 1991, p.619-632, 2 refs.
Lampo, R.G., Davies, A.G., Jr.
Thermal insulation, Tensile properties, Walls, Thermal stresses, Strain tests, Joints (junctions), Cracking (fracturing).
Information about tensile properties of exterior insulation finish system (EIFS) laminas has been unavailable to the engineering profession. Knowledge of the tensile properties of the reinforced laminas over the exterior surface of the insulation is key to EIFS performance and establishing rules for spacing expansion and control joints for different thicknesses in different climates.

46-583
Antarctic ecosystems: ecological change and conservation.
Kerry, K.R., ed, Berlin, Springer-Verlag, 1990, 427p., Refs. passim. For individual papers see 46-584 through 46-599 or B-44789 through B-44834.
Hempel, G., ed.
Ecology, Marine biology, Cryobiology, Algae, Sea ice, Pollution.
This volume is a collection of papers presented at the 5th Symposium on Antarctic Biology held in Hobart, Tasmania, Aug. 29-Sep. 3, 1988, concerning the short and long term changes in ecosystem and community structure caused by natural and human factors. The 45 papers which comprise this book are divided into the following areas of interest: long and medium term changes in the environment, seasonal changes in sea ice zones and off South Georgia, ecological and population changes in sea birds and mammals, actual and potential fisheries, and human impacts on terrestrial and marine systems. An article reviewing the Symposium, a general index and a genera and species index conclude the volume.

46-584
Environmental and biological variability in the McMurdo Ice Shelf ecosystem.
Howard-Williams, C., et al, Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.23-31, 25 refs.
Pridmore, R.D., Broady, P.A., Vincent, W.F.
Ice shelves, Algae, Cryobiology, Ecology, Meltwater, Ponds, Antarctica—McMurdo Ice Shelf.
The McMurdo Ice Shelf is an ablation region on the northwestern side of the Ross Ice Shelf. The surface forms the largest non-marine aquatic ecosystem in the McMurdo Sound region, with an interlinking system of lakes, pools and streams occurring across more than 1500 sq km. Two major types of ice shelf morphology with different physical and biological characteristics were distinguished: "Pinnacle Ice" with many small interconnected pools and streams, and "Undulating Ice" with continuous moraine cover and discrete pools and lakes. The flora of these is dominated by benthic rather than planktonic communities. Cyanobacteria which coat the base of the pools with mats and films of varying thickness are generally the most commonly occurring and abundant organisms. Benthic diatoms and coccoid chlorophytes are also found throughout the system. There are large variations in the conductivity and nutrient content of these waters, with a marine tidal influence in some parts. The water bodies are subject to continual change as the Ice Shelf moves, with marked temporal variability in environmental conditions on a diel, seasonal and long-term (years to decades) basis. This area contains the most extensive microbial growths in southern Victoria Land and is a potential inoculum source of micro-organisms for the entire region. (Auth.)

46-585

Signy Island as a paradigm of biological and environmental change in antarctic terrestrial ecosystems.

Smith, R.I.L., Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.32-50, 37 refs.

Cryobiology, Ecology, Climatic changes, Glacier oscillation, Ice cover effect, Biogeography, Acclimatization, Antarctica—Signy Island.

Examples of environmental, and consequently of biological, changes are presented for one climatically and ecologically sensitive locality, Signy I., to illustrate the diversity of changes which may affect the structure and dynamics of antarctic ecosystems in general. These are discussed in terms of ecological change resulting from long-term climatic trends, short-term climatic (especially summer temperature) fluctuations, plant colonization and growth, community development, and environmental perturbation. A plea is made for implementing long-term monitoring studies to determine the direction and rate of environmental and ecological changes, with particular regard to assessing the resilience of ecosystems to and their recovery from these phenomena. The antarctic environment offers probably the most significant baseline to which global atmospheric changes may be related. The predicted trend in global warming implies disturbing consequences for the future integrity of Antarctica's, and indeed the world's, environment and biota. However, it offers ideal opportunities to study the cause-and-effect relationship of ecological change and, from this, to develop a strong management policy for the active use and conservation of the antarctic biome. (Auth. mod.)

46-586

Colonization of terrestrial habitats—organisms, opportunities and occurrence.

Walton, D.W.H., Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.51-60, 56 refs.

Ecology, Cryobiology, Biogeography, Acclimatization.

The present antarctic and subantarctic flora and fauna should offer some valuable information on those groups of organisms which have successfully overcome the long-distance dispersal barrier and are adapted to colonization and establishment in a difficult environment. In addition, there is considerable potential for the experimental study of the process of colonization within these disjunct snow-free sites. This chapter considers briefly the range of organisms already established and the evidence for both long-distance and local dispersal. Propagule characteristics are examined in relation to dispersal potential. The process of colonization is examined for lichens from data gathered from outside Antarctica to illustrate the potential for application to polar sites. A generalized model is proposed based on habitat favorability for the colonizing event, and its heterogeneity in time and space. The inadequacies of data for this model and primary colonization in general are noted and three major fields identified for future research. (Auth. mod.)

46-587

Changes in vegetation on Heard Island 1947-1987.

Scott, J.J., Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.61-76, 27 refs.

Plant ecology, Revegetation, Biogeography, Glacier melting, Heard Island.

The Heard and McDonald Islands are the only subantarctic island group which appears to be free of human-introduced animals and plants. Vegetation changes in its species-poor flora are therefore likely to be due to natural factors. Significant glacial recession has exposed new areas for colonization over the past 40 years. Analysis of vegetation transect data from 7 glacier retreat zones and adjacent areas indicates 4 main patterns of primary colonization, with moisture availability and effects of animal disturbance being major differentiating environmental factors. It can be expected that with continuing climatic amelioration and glacial recession, the size of vegetated areas will expand. Changes in distribution of some vascular plant species around the island have been noted and tentatively linked with climatic warming, and additional changes are predicted. Future effects of changing trends in population numbers of animals utilizing and interacting with terrestrial vegetation communities are uncertain. Further changes can now be monitored from recently established reference points. (Auth. mod.)

46-588

Evidence for change in the chemistry of maritime antarctic Heywood Lake.

Ellis-Evans, J.C., Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.77-82, 19 refs.

Ecology, Cryobiology, Nutrient cycle, Lake ice, Lake water, Water chemistry, Limnology, Antarctica – Heywood Lake.

Data collected at monthly intervals over the past 16 years from Heywood Lake reveal that, within a given year, physical, chemical and biological variables generally interacted predictably. The elephant seal population of the catchment has remained static over the entire period of study but fur seal numbers have been increasing steadily within the catchment over the past 10 years. A pronounced increase in peak winter concentrations of both dissolved reactive phosphate (DRP) and ammonium released from anoxic sediments is evident over the same period. A clear trend in recent years towards increasing summer open-water concentrations of ammonium-N indicates an influx of nutrients via surface runoff in addition to winter sediment release. This would also seem to be a consequence of the increasing fur seal presence in the catchment area. No evidence of increasing summer chlorophyll-*a* concentration was found, which conforms with the current hypothesis that light, rather than nutrient status, controls phytoplankton population dynamics in Heywood Lake during the open-water period. (Auth. mod.)

46-589

Eutrophication and vegetation development in maritime antarctic lakes.

Hawes, I., Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.83-90, 35 refs.

Plankton, Plant ecology, Nutrient cycle, Cryobiology, Lakes, Photosynthesis, Limnology, Algae, Antarctica—Signy Island.

Differences in water chemistry and in the composition, abundance and activity of benthic and planktonic plant communities were observed in freshwater lakes of different trophic status at Signy I., maritime Antarctica. Phytoplankton density increased with increasing nutrient concentration. Picoplankton (<2 microns) contributed most chlorophyll-*a* and numbers to the phytoplankton in all lakes, but the nanoplankton fraction (2-20 microns) was disproportionately active in photosynthesis. Some algae only occurred in the eutrophic lakes, notably a large *Chlamydomonas* sp., while smaller flagellated chlorophytes, chrysophytes and cryptophytes predominated in the nanoplankton of oligotrophic lakes. Partitioning of photosynthate in protein, polysaccharide, lipid and metabolite fractions showed little difference among the lakes. (Auth.)

46-590

Preliminary study of benthic diatoms in contrasting lake environments.

Oppenheim, D.R., Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.91-99, 44 refs.

Algae, Ecology, Cryobiology, Lakes, Biogeography, Antarctica—Signy Island.

Eleven of the 17 freshwater lakes from Signy I. were sampled by snorkel divers. A list of diatom taxa identified from benthic samples is presented. Most freshwater taxa listed were rare and only a few taxa were observed abundantly in many lakes. Assemblage composition varied among three broad lake categories: proglacial, oligotrophic, and mesotrophic lakes. Assemblage composition also changed with lake depth in the larger lakes. A second, more detailed study was undertaken on an oligotrophic and a mesotrophic lake. No seasonal trends could be identified. The limitation of the methods used are discussed, and spatial and temporal variability in antarctic lakes is considered. (Auth.)

46-591

Seasonal and regional variation in the pelagial and its relationship to the life history cycle of krill.

Smetacek, V., et al, Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.103-114, 95 refs.

Scharek, R., Nöthig, E.M.

Algae, Ecology, Marine biology, Cryobiology, Sea ice, Biomass, Seasonal variations.

In vast areas of the southern ocean, algal biomass is low but that of grazers comparatively high. It is argued that antarctic zooplankton, particularly the dominant copepods, are efficiently geared to the pelagic system overlying the deep ocean and maintain sizeable, stable stocks that undergo minor winter decline. The same is true for krill *(Euphausia superba)* but this animal is large enough to exploit the antarctic pelagial in a unique way. It retreats to the ice undersurface during the long winter and feeds with high efficiency on plankton concentrations following ice melt. Apparently, krill has geared its life cycle to oceanic circulation patterns, including that of the ice, in a way that maximizes seasonal and regional exploitation of food resources. Adaptation to the rugged ice undersurface is probably the most important factor enabling maintenance of a uniquely large monospecific stock of planktivores in a low productive ocean. The concept of ice as a hostile habitat must be revised; rather than posing a problem for survival, it provides the answer to the age-old riddle of high animal biomass in an icy environment. (Auth. mod.)

46-592

Primary production and consumption in McMurdo Sound, Antarctica.

Knox, G.A., Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.115-128, 76 refs.

Biomass, Ecology, Cryobiology, Marine biology, Algae, Sea ice, Ice shelves, Ocean currents, Antarctica—McMurdo Sound.

This chapter provides a first synthesis of the data on primary production and consumption by invertebrate consumers in McMurdo Sound. The McMurdo Sound environment is briefly described, covering aspects such as bathymetry, sea ice development and breakout, and the hydrological regime. Based on available information, an interpretation of the circulation patterns within the Sound and beneath the McMurdo Ice Shelf is given. A simple model of primary production and consumption is presented and the annual production cycle is discussed. The impacts of perturbations, such as variations in the timing and extent of the sea ice breakout, the depth of snow cover on the sea ice, and changes in the current systems under the influence of external driving forces are briefly discussed. The main points to emerge are: the McMurdo Sound primary production is high when compared with that of the open southern ocean, but it is comparable to that of the ice edge zone; the important contribution made to primary production by the annual *Phaeocystis* bloom; the major contribution which is made by the benthic microalgae in shallow inshore waters; a contribution that has been largely ignored in studies to date; the high degree of natural variability within the system; the potential for change in the various environmental variables that influence the system; and the deficiencies in the database and the need for integrated year-round studies of primary production and consumption. (Auth. mod.)

46-593

Seasonal and geographic variations in sea ice community structure of the Weddell Sea, Antarctica.

Spindler, M., et al, Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.129-135, 37 refs.

Dieckmann, G.S., Lange, M.A.

Ecology, Marine biology, Cryobiology, Sea ice, Seasonal variations, Antarctica—Weddell Sea.

Seasonal and spatial variation in sea ice organisms were studied in the Weddell Sea region during summer 1985 and winter and spring 1986. Sea ice cores were collected from 22 stations. Winter values for chlorophyll *a* measured per 10 cm segment of drilled ice core ranged between 0 and 49 micrograms/l (mean 3.4) during July-Sep. and between 0 and 450 micrograms/l (mean 7.6) during Oct.-Dec., while mean summer values were considerably higher (mean 34.5) with a maximum of 2220 micrograms/l. Increasing numbers of sea ice organisms were also observed in sea ice cores in spring. Samples taken later in the season (Nov. compared to Oct.) revealed a higher biomass and more organisms. Algal biomass and absolute numbers of sea ice organisms, including foraminifers, copepods and ciliates, decreased along a transect from the ice edge towards the continent and along the eastern Weddell Sea coast from northeast to southwest. (Auth. mod.)

46-594

Seasonal variation in ice algal assemblages in the fast ice near Syowa Station in 1983/84.

Watanabe, K., et al, Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.136-142, 21 refs.

Satoh, H., Hoshiai, T.

Algae, Ecology, Cryobiology, Marine biology, Fast ice, Sea ice, Seasonal variations, Antarctica—Showa Station.

Ice algal assemblages in the fast ice near Showa Station were investigated from Mar. 1983 to Jan. 1984. Peaks in the standing crop (chlorophyll *a*) occurred in Apr.-June and Oct.-Nov.; the largest occurred in mid-Nov. at a site with moderate snow cover. Chlorophyll was most highly concentrated in the bottom of the ice, where the diatoms *Amphiprora kufferathii, Berkeleya rutilans, Nitzschia lecointei, N. stellata, N. turgiduloides* and *Pleurosigma directum* were dominant. The chlorophyll concentration within the ice developed mainly in May, with little change during the following months at heavily snow covered sites. It increased in the upper consolidated snow layer during Oct.-Jan. The dominant species, *Tropidoneis* sp., was a minor component of the interior and bottom ice layers. Results suggest that the interior ice algal assemblage was formed by mechanical inclusion of microalgae at the time of sea ice formation, and did not grow in the ice. However, the bottom assemblage grew when irradiance was high enough. The surface assemblage, which was presumed to be inoculated by an interior assemblage through vertical channels, grew in spring. (Auth. mod.)

46-595

Seasonal variation of particulate organic matter under the antarctic fast ice and its importance to benthic life.

Matsuda, O., et al, Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.143-148, 12 refs.

Ishikawa, S., Kawaguchi, K.

Biomass, Ecology, Cryobiology, Marine biology, Fast ice, Sea ice, Seasonal variations, Antarctica—Lützow-Holm Bay.

Qualitative and quantitative analyses were carried out on organic matter in suspended particulate matter of seawater for a period of 1 year under the fast ice in Lützow-Holm Bay during 1984/85. Marked seasonal variation of suspended organic matter, in particular chlorophyll *a*, was observed. The concentration of suspended organic matter was generally high in summer and low in winter. The maximum value of chlorophyll *a* standing stock through the water column was 25 mg sq m and the minimum was 0.4 mg/sq m. Maximum standing stock of particulate organic carbon was 9076 mg/sq m and the minimum was 1632 mg/sq m. However, the magnitude of the variation was low compared with the downward flux of particulate organic matter already reported for the same station. Suspended particles were rich in fresh algae and nutrients only during summer due to proliferation of phytoplankton and ice algae. (Auth. mod.)

46-596
Seasonal patterns of ichthyoplankton distribution and abundance in the southern Weddell Sea.
Hubold, G., Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.149-158, 25 refs.
Plankton, Ecology, Marine biology, Cryobiology, Seasonal variations, Antarctica—Weddell Sea.
The distribution and abundance of fish larvae were analyzed in early spring (Oct.-Nov. 1986) and summer (Jan.-Feb. 1985) during two cruises of the RV *Polarstern* to the southern Weddell Sea. In Oct. mostly post-larval and juvenile notothenioids were collected. A few larval specimens were represented by *Muraenolepis microps* and *Macrourus* sp. Larvae of *Pleuragramma antarcticum* and two channichthyids hatched near Vestkapp by mid Nov. In Jan., post-larval *P. antarcticum* dominated the ichthyoplankton (98% by numbers). The abundance of this species decreased by a factor of 5 between Jan. and Feb., while its distribution extended far beyond the continental shelf. Other notothenioids and oceanic *Electrona* sp. and *Nototepis* sp. appeared later in the season, and were equally abundant in both months. Of a total of 23 ichthyoplankton species, no more than 16 occurred together in each month. (Auth. mod.)

46-597
Comparison of airborne alkaline pollution damage in selected lichens and mosses at Casey Station, Wilkes Land, Antarctica.
Adamson, E., et al, Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.347-353, 11 refs.
Seppelt, R.D.
Air pollution, Environmental impact, Lichens, Mosses, Concrete placing, Dust, Soil pollution, Antarctica—Casey Station.
Umbilicaria decussata, Usnea sphacelata, Ceratodon purpureus and surface soil samples were collected at 10 m intervals for 90 m downwind of a concrete batching site at Casey Station. Comparable samples were collected from a similar uncontaminated remote site. Surface soil was alkaline in the immediate vicinity of the batching site (max. pH 8.8) and tended to decrease with distance. In the control site, surface soil was acidic (pH 4.7). Lichens growing downwind of the batching site were more susceptible to damage from airborne alkaline pollution than the mosses and were moderately to severely bleached. This chapter describes the relation between mean total chlorophyll concentration, chlorophyll a/b ratio, distance from the batching site and soil pH. Low temperature (77K) fluorescence of healthy plants from the control site and polluted plants 40 m downwind of the batching plant were compared. Variable fluorescence, indicative of photosynthetic electron transport, was observed in all cases. (Auth. mod.)

46-598
Marine biota as detection agents for low-level radionuclide contamination in Antarctica and the Southern Hemisphere oceans.
Wood, W.F., et al, Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.372-378, 12 refs.
Marsh, K.V., Buddemeier, R.W., Smith, C.
Water pollution, Fallout, Marine biology, Ecology, Environmental impact.
The Southern Hemisphere oceans are generally free of radionuclide contamination. This chapter reports on the use of marine biota as indicators of radionuclide contamination in these waters. Sampling methods were developed and were tested using plankton and the kelp, *Ecklonia radiata*, as bioconcentrators of artificial radionuclides. Plankton sampling yielded concentrations of radionuclides including Be-7, Nb-95 and Ce-144. Transplanted *E. radiata* was an efficient concentrator of I-131. Rapid uptake of I-131 by kelp plants was observed. Both the plankton and macroalgae sampling methods will detect low levels of nuclear fission products below levels detectable by conventional air filters. The methods are suitable for monitoring radionuclide concentrations in southern ocean and antarctic waters. Members of the Laminariales grow on subantarctic islands and are strategically placed to monitor radioactivity advecting eastward in the southern ocean. (Auth. mod.)

46-599
Effect of ultraviolet radiation on antarctic marine phytoplankton.
El-Sayed, S.Z., et al, Antarctic ecosystems: ecological change and conservation. Edited by K.R. Kerry and G. Hempel, Berlin, Springer-Verlag, 1990, p.379-385, 22 refs.
Stephens, F.C., Bidigare, R.R., Ondrusek, M.E.
Algae, Marine biology, Ultraviolet radiation, Photosynthesis, Ecology, Cryobiology, Sea ice, Plankton, Antarctica—Palmer Station.
During Nov.-Dec. 1987, a series of experiments were conducted at Palmer Station to study the effects of ultraviolet radiation (UV) on phytoplankton collected from Arthur Harbor, Anvers I. Three parameters were studied: primary production rates; photosynthetic pigments; and photosynthesis-irradiance responses. These parameters were monitored during short-term and relatively long-term exposures to varying levels of UV radiation. The results of this month-long study provide evidence of some potentially deleterious effects of enhanced UV radiation on antarctic phytoplankton. The implications of these findings for the understanding of the ecology of the southern ocean are discussed. (Auth.)

46-600
Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes.
Cheng, K.C., ed, New York, Hemisphere Publishing Corporation, 1991, 787p., Refs. passim. For selected papers see 46-601 through 46-619.
Seki, N., ed.
Heat transfer, Phase transformations, Ice formation, Ice water interface, Soil freezing, Liquid solid interfaces, Pipeline freezing, Icing, Hoarfrost.

46-601
Historical and recent developments in the research of cold regions heat transfer—ice in air, water and earth.
Cheng, K.C., et al, MP 2960, Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.17-62, 465 refs.
Yen, Y.C.
Heat transfer, Ice formation, Icing, Soil freezing, History, Bibliographies, River ice, Lake ice, Permafrost.
A brief review of historical and recent developments of ice formation problems in air, water and earth was made covering such subjects as atmospheric and marine icings of structures, permafrost and ground freezing (frost heave), river and lake ice (frazil ice and supercooling), arctic oil and gas pipelines, and heat transfer with freezing and melting from the unified viewpoint of cold regions heat transfer. An attempt was made to review the varied technical fields involving ice formation phenomena from the common viewpoint of heat transfer, to show the scope and subjects of cold regions heat transfer engineering.

46-602
Conduction with freezing and thawing.
Lunardini, V.J., MP 2961, Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.65-129, 92 refs.
Heat transfer, Conduction, Soil freezing, Ground thawing, Analysis (mathematics), Stefan problem, Phase transformations.
Conduction of heat transfer with solidification is a subset of the mathematical theory called Stefan problems or moving boundary problems. The exact solutions available are examined in some detail to yield insight into useful techniques, but approximate methods tend to be more useful for practical engineering problems. The concepts involved in the heat balance integral method, the quasi-static method, and perturbation methods are noted. Graphs are presented to aid in the application of theory to practical problems, especially those dealing with soil systems. Numerical methods and problems with significant convective aspects have not been examined, nor has an attempt been made to do more than survey the literature of conduction heat transfer with phase change.

46-603
Numerical and analytical aspects in freezing and melting.
Saitoh, T., Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.131-174, 123 refs.
Heat transfer, Phase transformations, Boundary value problems, Freezing front, Analysis (mathematica), Heat recovery, Freezing, Melting, Liquid solid interfaces.

46-604
Order of magnitude analysis on liquid solidification in pipe flows.
Hwang, G.J., et al, Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.177-198, 17 refs.
Chen, R.S.
Pipe flow, Liquid solid interfaces, Phase transformations, Analysis (mathematics), Laminar flow, Ice formation, Heat transfer.

46-605
On the freeze occlusion of water.
Lock, G.S.H., Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.199-221.
Water flow, Ice water interface, Ice growth, Analysis (mathematics), Ice formation, Ice cover effect.

46-606
Ice-band structure on the freezing of flowing water in pipe.
Hirata, T., Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.223-234, 6 refs.
Pipeline freezing, Pipe flow, Ice formation, Water flow, Ice water interface, Heat transfer, Analysis (mathematics), Water pipes.

46-607
Freezing fractures in water pipes.
Inaba, H., Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.235-257, 15 refs.
Pipeline freezing, Water pipes, Ice formation, Fracturing, Analysis (mathematics), Ice pressure.

46-608
Onset of convection and heat transfer characteristics in ice-water systems.
Yen, Y.C., MP 2962, Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.261-314, 34 refs.
Convection, Ice water interface, Heat transfer, Ice melting, Phase transformation, Analysis (mathematics), Density (mass/volume).
This review discusses the problems associated with the anomalous temperature-density relations of water. It deals with the subjects of onset of convection, the temperature structure and natural convective heat transfer and the laminar forced convective heat transfer in the water/ice system. The onset of convection in a water/ice system was found to be dependent on thermal boundary conditions, not a constant value as in the classical fluids. This system also exhibits a unique temperature distribution in the melt layer immediately after the critical Rayleigh number is exceeded, and soon after it establishes a more or less *constant* temperature region which expands to about two-thirds of the melt layer depth. The constant temperature is approximately 3.2 C for water layer formed from melting above, but varies for melt layers formed from below. The heat flux across the water/ice interface was found to be a weak power function and to increase linearly with temperature for melt layer formed from above and below, respectively. Both theoretical and experimental melting studies of ice spheres, cylinders and vertical plates show a minimum heat flux at the inversion temperature ranging from 5.1 to 5.6 C. For the case of laminar forced convection melting heat transfer, the presence of an interfacial velocity reduces heat transfer in comparison with the case without phase change.

46-609
Convective flow generated by a pipe in a semi-infinite porous medium saturated with water in the neighborhood of 4 C.
Robillard, L., et al, Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.315-338, 39 refs.
Vasseur, P.
Convection, Heat loss, Underground pipelines, Heat transfer, Water temperature, Density (mass/volume), Analysis (mathematics).

46-610
Heat transfer problems on ice and snow.
Fukusako, S., et al, Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.341-389, 224 refs.
Seki, N.
Heat transfer, Ice formation, Ice melting, Snow melting, Phase transformations, Analysis (mathematics).

46-611
Snow melting by radiative heating.
Sugawara, M., et al, Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.391-411, 12 refs.
Seki, N., Kimoto, K.
Snow melting, Radiant heating, Artificial melting, Heat transfer, Analysis (mathematics).

46-612
Heat and mass transfer in the frosting process on cold surfaces.
Saito, H., et al, Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.415-449, 115 refs.
Tokura, I.
Heat transfer, Mass transfer, Hoarfrost, Ice formation, Frost forecasting, Analysis (mathematics).

46-613
Study of frost formation.
Aoki, K., et al, Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.451-487, 82 refs.
Hattori, M., Hayashi, Y.
Hoarfrost, Ice formation, Heat transfer, Analysis (mathematics).

46-614
Solidification and melting of solutions.
Hayashi, Y., Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.491-519, 45 refs.
Heat transfer, Phase transformations, Liquid solid interfaces, Solutions, Analysis (mathematics).

46-615
Frazil ice.
Daly, S.F., MP 2963, Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.523-544, 21 refs.
Frazil ice, Ice formation, Ice crystal growth, Heat transfer, Ice crystal collision, Nucleation, Analysis (mathematics).
A physically based quantitative model of frazil ice in natural water bodies, which describes the dynamic evolution of the *frazil crystal size distribution function, is developed. The crys*tal number continuity equation and the heat balance for a differential volume serve as the basis for the model. The crystal growth rate and secondary nucleation rate are the major parameters that appear in these equations. Expressions for both are derived. The crystal growth rate is controlled by the heat transfer rate from the crystal to the supercooled water, which is shown to be a function of the crystal size, the fluid turbulence and the fluid properties. Secondary nucleation is assumed to be caused by collisions, which cause fragments of the crystals to shear off. These fragments become new crystals.

46-616
Frost heaving in artificial ground freezing.
Ohrai, T., et al, Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.547-580, 30 refs.
Yamamoto, H.
Frost heave, Soil freezing, Artificial freezing, Soil stabilization, Analysis (mathematics).

46-617
Physics of freezing soils and an engineering frost heave approach.
Konrad, J.M., Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.581-612, 36 refs.
Soil freezing, Frost heave, Frozen ground physics, Analysis (mathematics).

46-618
On the modeling of ice accretion.
Lozowski, E.P., et al, Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.615-660, 137 refs.
Gates, E.M.
Ice accretion, Icing, Ice models, Mathematical models.

46-619
Modeling and forecasting vessel icing.
Zakrzewski, W.P., et al, Freezing and melting heat transfer in engineering: selected topics on ice-water systems and welding and casting processes. Edited by K.C. Cheng and N. Seki, New York, Hemisphere Publishing Corporation, 1991, p.661-706, 77 refs.
Lozowski, E.P.
Ship icing, Ice models, Ice forecasting, Mathematical models.

46-620
Aircraft landing gear systems.
Tanner, J.A., ed, SAE Progress in technology series, PT-37, Warrendale, PA, Society of Automotive Engineers, 1990, 344p., Refs. passim. + appended bibliography. For selected papers see 46-621 through 46-625.
Aircraft, Vehicle wheels, Skid resistance, Road icing, Runways, Tires, Brakes (motion arresters), Traction, Safety.

46-621
Summary of recent aircraft/ground vehicle friction measurement tests.
Yager, T.J., SAE Progress in technology series, PT-37, Aircraft landing gear systems. Edited by J.A. Tanner, Warrendale, PA, Society of Automotive Engineers, 1990, p.29-35, 22 refs.
Runways, Skid resistance, Rubber ice friction, Rubber snow friction, Vehicle wheels, Safety, Aircraft, Road icing.

46-622
Aircraft and ground vehicle friction measurements obtained under winter runway conditions.
Yager, T.J., SAE Progress in technology series, PT-37, Aircraft landing gear systems. Edited by J.A. Tanner, Warrendale, PA, Society of Automotive Engineers, 1990, p.37-41, 22 refs.
Runways, Skid resistance, Rubber ice friction, Rubber snow friction, Tires, Vehicle wheels, Road icing, Safety.

46-623
Current status of joint FAA/NASA runway friction program.
Yager, T.J., et al, SAE Progress in technology series, PT-37, Aircraft landing gear systems. Edited by J.A. Tanner, Warrendale, PA, Society of Automotive Engineers, 1990, p.43-47, 22 refs.
Vogler, W.A.
Runways, Skid resistance, Rubber ice friction, Rubber snow friction, Tires, Vehicle wheels, Road icing, Safety.

46-624
Alternate launch and recovery surface traction characteristics.
Carter, T.J., et al, SAE Progress in technology series, PT-37, Aircraft landing gear systems. Edited by J.A. Tanner, Warrendale, PA, Society of Automotive Engineers, 1990, p.253-260.
Treanor, D.H., Lewis, M.D.
Pavements, Rubber ice friction, Runways, Skid resistance, Traction, Tires, Road icing.

46-625
Late Pleistocene ice-wedge casts and sand-wedge relics in the Wyoming Basins, USA.
Nissen, T.C., et al, *Permafrost and periglacial processes*, July-Dec. 1990, 1(3-4), p.201-219, With French summary. 39 refs.
Mears, B., Jr.
Pleistocene, Ice wedges, Fossil ice, Periglacial processes, Permafrost indicators, Soil analysis, Geocryology, Patterned ground, Particle size distribution.

46-626
Relict periglacial features east of Waterton-Glacier Parks, Alberta and Montana, and their palaeoclimatic significance.
Karlstrom, E.T., *Permafrost and periglacial processes*, July-Dec. 1990, 1(3-4), p.221-234, With French summary. 44 refs.
Quaternary deposits, Periglacial processes, Paleoclimatology, Permafrost indicators, Ice wedges, Cryoturbation, Soil analysis, Soil formation, Stratigraphy, Geocryology.

46-627
Observations of winter aeolian transport and niveo-aeolian deposition at Crater Lake, Pangnirtung Pass, N.W.T., Canada.
Neuman, C.M., *Permafrost and periglacial processes*, July-Dec. 1990, 1(3-4), p.235-247, With French summary. 25 refs.
Continuous permafrost, Arctic landscapes, Eolian soils, Sediment transport, Wind factors, Periglacial processes, Seasonal variations, Soil erosion, Abrasion, Topographic effects.

46-628
Stratification mechanisms in slope deposits in high subequatorial mountains.
Francou, B., *Permafrost and periglacial processes*, July-Dec. 1990, 1(3-4), p.249-263, With French summary. 48 refs.
Mountain soils, Talus, Stratification, Solifluction, Periglacial processes, Cryoturbation, Slope processes, Ice needles, Freeze thaw cycles.

46-629
Temperature variation and apparent thermal diffusivity in the refreezing active layer, Toolik Lake, Alaska.
Hinkel, K.M., et al, *Permafrost and periglacial processes*, July-Dec 1990, 1(3-4), p.265-274, With French summary. 32 refs.
Outcalt, S.I., Nelson, F.E.
Active layer, Soil freezing, Periglacial processes, Permafrost heat transfer, Permafrost thermal properties, Soil temperature, Thermal diffusion, Subsurface investigations, Temperature variations.

46-630
Closed system pingo in the paleozoic dolomite of the Canadian Arctic. [Un pingo en système fermé dans des dolomies paléozoïques de l'Arctique Canadien].
St-Onge, D.A., et al, *Permafrost and periglacial processes*, July-Dec. 1990, 1(3-4), p.275-282, In French with English summary. 16 refs.
Pissart, A.
Pingos, Geomorphology, Continuous permafrost, Periglacial processes, Subpermafrost ground water, Rock mechanics, Landforms, Geologic processes, Permeability.

46-631
Cryogenic physico-chemical precipitations: iron, silica, calcium carbonate.
Vogt, T., *Permafrost and periglacial processes*, July-Dec. 1990, 1(3-4), p.283-293, With French summary. 27 refs.
Quaternary deposits, Minerals, Geocryology, Periglacial processes, Permafrost weathering, Soil analysis, Scanning electron microscopy, Solutions.

46-632
Geomorphic activity of rivers during snow melt and break-up, Richardson Mountains, Yukon and Northwest Territories, Canada.
Priesnitz, K., *Permafrost and periglacial processes*, July-Dec. 1990, 1(3-4), p.295-299, With French summary. 20 refs.
Permafrost hydrology, Snowmelt, Rivers, Classifications, Ice breakup, Flooding, Runoff, Geomorphology, Sediment transport.

46-633
Chronology of periglacial structures in northern China.
Sun, J.Z., *Permafrost and periglacial processes*, July-Dec. 1990, 1(3-4), p.301-308, With French summary. 14 refs.
Periglacial processes, Cryogenic structures, Age determination, Ice wedges, Permafrost indicators, Paleoclimatology, Stratigraphy, China.

46-634
Permafrost in the arid mountains of middle Asia—the Eastern Pamirs, USSR.
Gorbunov, A.P., *Permafrost and periglacial processes*, July-Dec. 1990, 1(3-4), p.309-312, With French summary. 10 refs.
Mountain soils, Discontinuous permafrost, Desert soils, Geocryology, Periglacial processes, Soil water, Cryogenic structures, Desiccation, Altitude.

46-635
Secondary sorting of sorted patterned ground.
Warburton, J., *Permafrost and periglacial processes*, July-Dec. 1990, 1(3-4), p.313-318, With French summary. 13 refs.
Periglacial processes, Patterned ground, Sorting, Geocryology, Soil surveys, Polygonal topography, Desiccation, Cracking (fracturing).

46-636
Ground-water resources of the Palmer-Big Lake area, Alaska: a conceptual model.
Jokela, J.B., et al, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Report of investigations*, July 1991, 90-4, 38p. + maps, 20 refs.
Munter, J.A., Evans, J.G.
Water reserves, Water flow, Ground water, Water supply, Hydrogeology, Watersheds, Models, Water pollution, Surface waters.

46-637
Sediment transport in the Mackenzie River plume.
Davidson, S., et al, *Geological Survey of Canada. Open file*, Jan. 1988, No.2303, 92p. + appends., 23 refs.
de Margerie, S., Lank, K.
Estuaries, Ocean bottom, Bottom sediment, Sediment transport, Ice cover effect, Hydrodynamics, Littoral zone, Shore erosion, Suspended sediment, Canada—Beaufort Sea.

46-638
Occurrence of early snow-free zones on Fosheim Peninsula, Ellesmere Island, Northwest Territories.
Woo, M.K., et al, *Geological Survey of Canada. Current research, part B*, July 1991, 91(1B), p.9-14, With French summary. 3 refs.
Edlund, S.A., Young, K.L.
Snow cover distribution, Snowmelt, Microclimatology, Snow surveys, Frost penetration, Soil water, Vegetation patterns, Air temperature, Periodic variations.

46-639
Quasi-steady problems in freezing soils: 3. Analysis of experimental data.
Nakano, Y., et al, *Cold regions science and technology*, Aug. 1991, 19(3), MP 2964, p.225-243, 24 refs.
Takeda, K.
Soil freezing, Frost heave, Ice lenses, Ice growth, Frozen ground expansion, Water pressure, Mathematical models, Freezing front, Phase transformations, Temperature gradients.
The results of mathematical and experimental studies presented in the two earlier papers in this series (parts I and II) on the three distinct and representative models of a frozen fringe, M-1, M-2, and M-3, clearly show that the model M-1 is consistent with the experimental data while the empirical evidence against M-2 and M-3 is overwhelming. In this work the properties of the model M-1 are further examined by analyzing the experimental data in detail. It is found that the properties of a frozen fringe based on the model M-1 are consistent with the experimental data, and that the predicted steady growth condition of an ice layer is in excellent agreement with the condition found empirically.

46-640
Low-temperature anaerobic filtration of septic tank effluent.
Viraraghavan, T., et al, *Cold regions science and technology*, Aug. 1991, 19(3), p.245-252, 6 refs.
Dickenson, K.
Sewage treatment, Tanks (containers), Bacteria, Filters, Cold weather performance, Design, Temperature effects, Low temperature tests, Microbiology.

46-641
Electro-osmosis in a frozen soil.
van Gassen, W., et al, *Cold regions science and technology*, Aug. 1991, 19(3), p.253-259, 16 refs.
Sego, D.C.
Frozen ground expansion, Electroosmosis, Temperature effects, Freezing potential (electrical), Soil water migration, Soil freezing, Soil tests, Unfrozen water content, Temperature gradients.

46-642
Seasonal changes in sea ice optical properties during fall freeze-up.
Perovich, D.K., *Cold regions science and technology*, Aug. 1991, 19(3), MP 2965, p.261-273, 27 refs.
Sea ice, Optical properties, Freezeup, Albedo, Snow cover effect, Radiance, Seasonal variations, Ice optics, Salinity, Light transmission, Photosynthesis.
During the seasonal transition from summer to winter conditions, a sea ice cover undergoes a profound transformation. As the air temperature drops, the ice cools, the brine volume decreases, melt ponds freeze, new ice forms in areas of open water, and the surface becomes snow-covered. There is a corresponding change in the optical properties of the ice cover, with albedos increasing and transmittances decreasing. Measurements of spectral albedos, reflectances and incident irradiances were made at visible and near-infrared wavelengths (400-1100 nm) during fall freeze-up. In general, albedos increased as freeze-up progressed, with the increase being most pronounced at shorter wavelengths. The greatest temporal changes occurred in a freezing lead where, in only a few days, albedos increased from 0.1 for open water to 0.9 for snow-covered young ice. The evolution of the transmitted radiation field under the ice was estimated using a two-stream, multilayer radiative transfer model in conjunction with observations of ice morphology and thickness. Transmission decreased dramatically due to ice cooling, snowfall, and declining incident solar irradiances. Light transmission through young ice was two orders of magnitude greater than through snow-covered multiyear ice.

46-643
Preliminary comparison of the properties of pure ice and sea ice single crystals.
Brown, R.L., et al, *Cold regions science and technology*, Aug. 1991, 19(3), p.275-284, 34 refs.
Kawamura, T.
Ice crystals, Sea ice, Mechanical properties, Ice deformation, Strain tests, Compressive properties, Brines, Porosity, Temperature effects.

46-644
Distribution parameters for flexural strength of ice.
Parsons, B.L., et al, *Cold regions science and technology*, Aug. 1991, 19(3), p.285-293, 14 refs.
Lal, M.
Ice strength, Flexural strength, Fracturing, Measurement, Tensile properties, Statistical analysis, Brittleness, Analysis (mathematics), Forecasting.

46-645
High-temperature ice creep tests.
Morgan, V.I., *Cold regions science and technology*, Aug. 1991, 19(3), p.295-300, 17 refs.
Ice creep, Strain tests, Ice deformation, Ice temperature, Loading, Temperature effects, Water content, Glacier flow, Rheology.

46-646
Snow accretion on overhead line conductors of finite torsional stiffness.
Skelton, P.L.I., et al, *Cold regions science and technology*, Aug. 1991, 19(3), p.301-316, 17 refs.
Poots, G.
Power lines, Snow loads, Snowflakes, Ice accretion, Snowstorms, Computerized simulation, Falling snow, Meteorological data, Mass transfer, Wind factors.

46-647
Experimental and theoretical study of the dynamics of powder snow avalanches.
Beghin, P., et al, *Cold regions science and technology*, Aug. 1991, 19(3), p.317-326, 11 refs.
Olagne, X.
Avalanche formation, Turbulent flow, Avalanche mechanics, Simulation, Air entrainment, Velocity measurement, Rheology, Analysis (mathematics), Buoyancy.

46-648
Automated measurements of crystal dimensions and concentration of inclusions in ice cores: methods and first results.
Zagorodnov, V.S., et al, *Cold regions science and technology*, Aug. 1991, 19(3), p.327-333, 12 refs.
Heintzenberg, J., Watanabe, O., Fujii, Y.
Ice cores, Ice sampling, Ice crystal structure, Measurement, Gas inclusions, Lasers, Sensors, Orientation, Physical properties.
This paper describes an experimental set-up for the automated measurement of linear dimensions of crystals in samples of artificial and natural ice, and shows the feasibility of automatic measurements of concentration and dimensions of air inclusions. The theoretical rate of measurements of the above mentioned parameters can reach 1000 per second, corresponding to a travel speed of about 1 m/s when moving the sensors along an ice core. The narrow beam laser optics allow the detection of ice inclusions down to about one micrometer in diameter. Samples analyzed include cores acquired at Mizuho Station during the 25th Japanese Antarctic Research Expedition in 1984. (Auth. mod.)

46-649
Twenty-ninth Soviet Antarctic Expedition. Winter studies 1983-1985. [Dvadtsat' deviataia Sovetskaia antarkticheskaia ekspeditsiia. Zimovochnye issledovaniia 1983-1985 gg.],
Sovetskaia antarkticheskaia ekspeditsiia, *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.87, 156p., In Russian. Refs. passim. For individual papers see 46-650 through 46-655 or E-44844, E-44837, F-44840, F-44843, I-44838, I-44839, I-44841 and I-44842.
Bulatov, L.V., ed.
Expeditions, Ice navigation, Polar regions.
This volume contains information on observations and results of scientific efforts carried out by the 29th Soviet Antarctic Expedition in the winters of 1983-1985 on the antarctic continent and surrounding waters. Seasonal activities and organization of the expedition, including logistic support and contact with non-Soviet expeditions, are outlined in the first part of the book. The second part consists of 8 individual papers giving the scientific results of projects in oceanography, meteorology, glaciology and geophysics.

46-650
Hydrometeorological conditions in the Antarctic in 1984. [Gidrometeorologicheskie usloviia v Antarktike v 1984 g.],
Bozhkov, A.T., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.87, p.62-69, In Russian. 2 refs.
Bulatov, L.V., Riabkov, G.E.
Sea ice distribution, Ice edge, Meteorological data.
An analysis is reported of the ice processes in the southern ocean and the atmospheric circulation in the South Polar region based on data from antarctic stations, ships and radar satellite images. Included are decadal ice maps, results from observations of coastal ice, daily weather maps for the Southern Hemisphere, average monthly surface pressure and geopotential charts, air temperature and pressure anomalies, and meridional atmospheric circulation data. The monthly average position of the ice edge varied from 2-4 deg in latitude; the fast ice width ranged between 20 and 40 miles, and its thickness varied by 10 to 15 cm.

46-651
Formation and destruction of artificial barrier snowdrifts. [Formirovanie i razrushenie iskusstvennykh pribar'ernykh snezhnikov],
Efremov, IU.V., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.87, p.84-92, In Russian. 7 refs.
Snow retention, Wind factors, Snow fences, Snowdrifts, Snow accumulation, Antarctica - Granat, Cape
Experiments were carried out to study the formation of natural and artificial snowdrifts in the region of Cape Granat, and the most effective method to accumulate and preserve barrier snowdrifts. The following was found: the most favorable conditions for observation occur during easterly and southeasterly winds blowing at speeds not greater than 18 m/s; the snow accumulates most intensely during the months of June and Sep.; the application of latticed shields is the most expedient method for snow retention; the most significant factor in the destruction of snowdrifts is the thermodynamic influence of the sea.

46-652
Formation of water basins in Schirmacher Ponds during summer 1983-1984. [Formirovanie stoka vodoemov oazisa Shirmakhera v letnii sezon 1983-84 g.],
Loopmann, A.A., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.87, p.93-105, In Russian. 3 refs.
Klokov, V.D.
Ice shelves, Runoff, Limnology, Lake ice, Meteorological data, Flow rate, Antarctica—Schirmacher Ponds.
Data are presented concerning the water level, flow rate, volume and runoff layer from 5 basins investigated in the Schirmacher Ponds region in the summer of 1983-1984. The water level ranged from 0.5 to 1.0 m, the flow rate, 0.4-1.3 cu m/s, the runoff layer, at the basins' depth of 230-250 m, averaged 150 mm, increasing to 250 mm in areas 150-200 m deep; the runoff rate from the shelf ice water basin, at 100 m, reached 800 mm. The total runoff volume in relation to the Ponds' surface area was 5 to 135 m.

46-653
New data on the regime of Schirmacher Ponds. [Novye dannye o rezhime ozer oazisa Shirmakhera],
Loopmann, A.A., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.87, p.106-126, In Russian. 14 refs.
Limnology, Lake ice, Water temperature, Water chemistry, Meteorological factors, Antarctica—Schirmacher Ponds.
From observations carried out of the runoff rate within the drainage basins of Schirmacher Ponds during the summer of 1983-1984, new data is presented on the extent of ice cover, radiation regime and temperature. Results are shown in tables and graphs.

46-654
Scientific and operational provision of ice information for navigation. [Nauchno-operativnoe obespechenie sudokhodstva ledovoi informatsii],
Bozhkov, A.T., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.87, p.127-134, In Russian.
Ice navigation, Sea ice distribution, Ice reporting, Data processing, Imaging, Antarctica—Molodezhnaya Station.
Material collected during several expeditions showing the scientific and operational provision of ice information for navigation at Molodezhnaya Station between Jan. 1983 and Apr. 1985 is analyzed. Graphs and tables show the distribution - by year, month, location and the source, number, and type—of requests. These, and the satellite processing of the information forwarded to research vessels and fishing expeditions in antarctic waters, are discussed.

46-655
Geographic observations of Lake Unter-See. [Geograficheskie nabliudeniia v oazise Unter-Ze],
Simonov, I.M., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.87, p.135-153, In Russian. 17 refs.
Moraines, Glacial deposits, Limnology, Lake ice, Antarctica—Unter-See, Lake.
The location, geography, morphology, climate, dimensions, ice cover features and water characteristics of Lake Unter-See are described. Charts and tables are presented with the morphometric characteristics and profiles of the lake, contrasted with those of Lake Ober-See as control. Moraines found by the 28th and 29th Soviet antarctic expeditions in the region are discussed in detail. One of these of particular interest, and located in the southwestern corner of the lake next to the Anuchin Glacier, consists of rocks 2-3 m in diameter, unlike those found elsewhere in the lake. Discussion centers on the possible processes contributing to the formation of the moraines.

46-656
Structure of soil cover in the taiga region of the European Northeast. [Struktura pochvennogo pokrova taezhnoi zony evropeiskogo Severo-Vostoka],
Vtiurin, G.M., Leningrad, Nauka, 1991, 149p., In Russian. Refs. p.142-149.
Taiga, Soil structure, Cryogenic soils, Podsol, Peat, Clay soils, Soil formation.

46-657
Rules for the development and application of expanded standards and regulations. [Pravila razrabotki i primeneniia ukrupnennykh smetnykh norm i rastsenok].
Russia. Gosudarstvennyĭ komitet po delam stroitel'stva, Stroitel'nye normy i pravila. Chast' IV, Glava 14. Smetnye normy i pravila. Prilozhenie: Sborniki ukrupnennykh smetnykh norm. Zdaniia i sooruzheniia transporta. Sbornik No.10-2. Teplovozvagonnye delo dlia lokomotivov zheleznykh dorog promyshlennykh predpriiatiĭ (Construction standards and regulations. Part IV, Chapter 14. Cost standards and regulations. Supplement: Collections of expanded cost standards. Transportation buildings and constructions. Collection No.10-2. Diesel engine car work for railroad locomotives of industrial enterprises). Edited by A.D. Bobrov, I.A. Olonovskiĭ, A.A. Solin, and V.P. IUdenich, Moscow, Stroĭizdat, 1986, 116p., SNiP IV-14-84, In Russian.
Railroad cars, Railroad equipment, Transportation, Cold weather construction, Cold weather operation, Cost analysis.

46-658
Rules for determining the cost of materials, products, and construction, and the cost of transporting the construction goods. [Pravila opredeleniia smetnykh tsen na materialy, izdeliia i konstruktsii i smetnykh tsen na perevozki gruzov dlia stroitel'stva],
Russia. Gosudarstvennyĭ komitet po delam stroitel'stva, Stroitel'nye normy i pravila. Chast' IV, Glava 4. Smetnye normy i pravila. Prilozhenie: Dopolneniia k Sborniku srednikh smetnykh tsen na materialy, izdeliia i konstruktsii dlia stroitel'stva v raionakh Krainego Severa i otdel'nykh mestnostiakh, priravnennykh k nim (Construction standards and regulations. Part IV, Chapter 4. Cost standards and regulations. Supplement: Addenda to Collected average cost standards of materials, products, and construction in regions of the Far North and similar areas). Edited by E.IA. Labzina, G.N. Bogacheva, and V.V. Volkov, Moscow, Stroĭizdat, 1989, 127p., SNiP IV-4-82, In Russian.
Building codes, Cold weather construction, Cost analysis, Transportation.

46-659
Results of the first scientific expedition to the circumpolar region on the nuclear icebreaker *Sibir'*. [Rezul'taty pervoĭ nauchnoĭ ekspeditsii v pripoliusnom raione na atomnom ledokole *Sibir'*],
Chilingarov, A.N., ed, Leningrad, Gidrometeoizdat, 1990, 176p., In Russian. Refs. passim.
Krutskikh, B.A., ed.
Icebreakers, Snow composition, Expeditions, Ice conditions, Snow cover, Aerosols, Sea ice, Ozone, Ice navigation, Air ice water interaction, Salinity, Analysis (mathematics), Statistical analysis.

46-660
Feasibility of calculating the sublimation rate of dry ice pellets. [O vozmozhnosti rascheta skorosti isspareniia granuly tverdoĭ uglekislotyj],
Sudarchikov, A.M., *Moscow. Tsentral'naia aerologicheskaia observatoriia. Trudy*, 1991, Vol.175, p.108-120, In Russian with English summary. 10 refs.
Dry ice (trademark), Ice sublimation, Analysis (mathematics), Carbon dioxide.

46-661
Some aspects of the use of cooling agents for artificial dissipation of supercooled fogs and clouds. [Nekotorye aspekty primeneniia khladoreagentov dlia iskusstvennogo rasseianiia perokhlazhdennykh tumanov (oblakov)],
Sudarchikov, A.M., *Moscow. Tsentral'naia aerologicheskaia observatoriia. Trudy*, 1991, Vol.175, p.120-133, In Russian with English summary. 14 refs.
Dry ice (trademark), Supercooled clouds, Supercooled fog, Carbon dioxide, Nucleating agents.

46-662
Remote sensing investigations of icing processes on the Putorana Plateau.
Gienko, A.IA., *Polar geography and geology*, Jan.-Mar. 1991, 15(1), p.63-69, Translation of Materialy gliatsiologicheskikh issledovanii, 69:113-117, 1990. 10 refs.
Naleds, Remote sensing, USSR—Putorana Plateau.

46-663
Polar regions and their contribution to global environmental change.
Kondrat'ev, K.IA., et al, *Polar geography and geology*, Jan.-Mar. 1991, 15(1), p.70-84, Translation of Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia, No.1:36-46, 1991. 8 refs.
Kotliakov, V.M.
Environments, Climatic changes, Global change, Remote sensing, Polar regions.

46-664
Expedition ANTARKTIS-VIII of RV *Polarstern* 1989/90: Report of Leg ANT-VIII/5. [Die Expedition ANTARKTIS-VIII mit FS *Polarstern* 1989/90: Bericht vom Fahrtabschnitt ANT-VIII/5],
Miller, H., ed, *Berichte zur Polarforschung*, 1991, No.86, 155p., In German with English summary. Refs. passim.
Oerter, H., ed.
Expeditions, Ice shelves, Glaciology, Geology, Research projects, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf, Antarctica—Queen Maud Land.
The account is given of the Expedition which performed extensive glaciological and seismic work through the northeastern Weddell Sea to Atka Bay. Biological studies of penguins and seals were also made in this area. Additional observations were made from *Polarstern* between Kap Norwegia and the Antarctic Peninsula from mid-Jan. through mid-Feb. 1990. The Filchner-Ronne Ice Shelf glaciological/meteorological programs were undertaken during this same period. Programs were delayed during the entire season due to illness, injury, and various necessary but disruptive logistic requirements. By mid-Feb., the Expedition had completed its programs and began preparations for return to Germany.

46-665
Expedition ARKTIS-VII/1 of R/V *Polarstern* in 1990. [Die Expedition ARKTIS-VII/1 mit FS *Polarstern* 1990],
Thiede, J., ed, *Berichte zur Polarforschung*, 1991, No.80, 137p. + appr. 85p. core data, In German with English summary. 31 refs.
Hempel, G., ed.
Expeditions, Sea ice, Marine geology, Sediments, Drill core analysis, Marine biology, Greenland Sea.

46-666
Late Quaternary paleoglaciology and paleoceanography at the continental margin of the southern Weddell Sea, Antarctica. [Paläoglaziologie und Paläozeanographie im Spätquartär am Kontinentalrand des südlichen Weddellmeeres, Antarktis],
Melles, M., *Berichte zur Polarforschung*, 1991, No.81, 190p., In German with English summary. Refs. p.124-134.
Sea ice, Water chemistry, Sediments, Oceanography, Antarctica—Weddell Sea.
During four expeditions with RV *Polarstern* at the continental margin of the southern Weddell Sea, profiling and geological sampling were carried out. A detailed bathymetric map was constructed from echo-sounding data. Sub-bottom profiles, classified into nine echotypes, have been mapped and interpreted. Sedimentological analyses were carried out on 32 undisturbed box grab surface samples, as well as on sediment cores from 9 sites. The following characteristics were determined: grain-size distributions; carbonate and C-org content; component distributions in different grain-size fractions; stable oxygen and carbon isotopes in planktic and benthic foraminifers; and physical properties. The stratigraphy is based on C-14 dating, oxygen isotope stages, on paleomagnetic measurements, and Th-230 analyses. The sediments represent the period of deposition from the last glacial maximum until recent time. They are composed predominantly of terrigenous components. The formation of the sediments was controlled by glaciological, hydrographical and gravitational processes. Variations in the sea-ice coverage influenced biogenic production. The ice sheet and icebergs were important media for sediment transport; their grounding caused compaction and erosion of glacial marine sediments on the outer continental shelf. The circulation and the physical and chemical properties of the water masses controlled the transport of fine-grained material, biogenic production and its preservation. Gravitational transport processes were the main mode of sediment movements on the continental slope. (Auth. mod.)

46-667
Expedition ANTARKTIS VIII/1-2, 1989 with the Winter Weddell Gyre Study of the research vessels *Polarstern* and *Akademik Fedorov*. [Die Expedition ANTARKTIS VIII/1-2, 1989 mit der Winter Weddell Gyre Study der Forschungsschiffe *Polarstern* und *Akademik Fedorov*],
Augstein, E., et al, *Berichte zur Polarforschung*, 1991, No.84, 134p., In English with overall summary in German; p.47-53 in German with English summary.
Bagriantsev, N., Schenke, H.W.
Sea ice, Remote sensing, Ozone, Marine biology, Expeditions, Antarctica—Weddell Sea.
The Winter Weddell Gyre Study 1989 (WWGS'89) is a joint research project of the German vessel *Polarstern* and the USSR vessel *Akademik Fedorov* to investigate the oceanic circulation of the Weddell Sea at the end of the austral winter. This operation was the first of a total of four similar campaigns by which the mass, heat, salt and sea ice transports of the Weddell Gyre and the water mass modification in the southerly Weddell Basin will be quantitatively determined. The oceanic core program is complemented by detailed studies of sea ice dynamics and sea ice-water interactions, sea ice remote sensing, sea ice biota as well as the temporal and regional variations of the phyto- and zooplankton development in the Weddell Gyre regime. The recent cruises have supported measurements along four transects perpendicular to the oceanic circulation of the Weddell Sea. The zonal most southerly and the meridional most easterly track lines provide hydrographic sections across the entire gyre system, while the two others cover the northwesterly part of the eastward branch of the flow. The scientific field work in 1989 was primarily directed towards oceanography in the Weddell Sea, Maud Rise orography, sea ice physics and biology, remote sensing of sea ice, and ozone detection in the polar vortex. (Auth. mod.)

46-668
Microwave radiometry of snow-covered terrains.
Srivastava, S.K., et al, *International journal of remote sensing*, Oct. 1991, 12(10), p.2117-2131, 20 refs.
Singh, R.P.
Geophysical surveys, Remote sensing, Radiometry, Snow depth, Snow cover effect, Brightness, Microwaves, Surface roughness, Sensor mapping.

46-669
"Quad-Disc" static pressure probe for measurement in adverse atmospheres: with a comparative review of static pressure probe designs.
Nishiyama, R.T., et al, *Review of scientific instruments*, Sep. 1991, 62(9), p.2193-2204, 59 refs.
Bedard, A.J., Jr.
Measuring instruments, Probes, Atmospheric pressure, Cold weather operation, Design, Wind factors, Boundary layer, Airborne equipment, Meteorological data.

46-670
Regional hydrological effects of climate change.
Mimikou, M., et al, *Journal of hydrology*, Feb. 1991, 123(1-2), p.119-146, 19 refs.
Kouvopoulos, Y., Cavadias, G., Vayianos, N.
River basins, Hydrology, Runoff forecasting, Climatic changes, Snowmelt, Water balance, Temperature effects, Precipitation (meteorology).

46-671
Temperature visualizations by use of liquid crystals of unsteady natural convection during supercooling and freezing of water in an enclosure with lateral cooling.
Nishimura, T., et al, *International journal of heat and mass transfer*, Oct. 1991, 34(10), p.2663-2668, 12 refs.
Fujiwara, M., Horie, N., Miyashita, H.
Water, Supercooling, Ice growth, Convection, Crystals, Laboratory techniques, Heat transfer, Ice water interface, Liquid cooling.

46-672
Soil genesis associated with periglacial ground wedges, Laramie Basin, Wyoming.
Munn, L.C., et al, *Soil Science Society of America. Journal*, May-June 1991, 55(3), p.772-777, 31 refs.
Spackman, L.K.
Periglacial processes, Soil analysis, Soil dating, Soil formation, Permafrost indicators, Wedges, Mineralogy, Particle size distribution, Patterned ground.

46-673
Overwinter changes in physical properties of no-tillage soil.
Unger, P.W., *Soil Science Society of America. Journal*, May-June 1991, 55(3), p.778-782, 11 refs.
Agriculture, Soil composition, Soil conservation, Frost action, Freeze thaw cycles, Temperature effects, Physical properties, Water content, Seasonal variations.

46-674
Infrared spectra of solid films formed from vapors containing water and nitric acid.
Smith, R.H., et al, *Journal of physical chemistry*, July 25, 1991, 95(15), p.5924-5930, 26 refs.
Leu, M.T., Keyser, L.F.
Cloud physics, Infrared spectroscopy, Ozone, Chemical properties, Ice formation, Condensation, Water vapor, Spectra, Stratosphere, Scavenging, Low temperature tests.
Infrared spectra have been recorded at 188 K for crystalline mono- and trihydrates of nitric acid formed by vapor deposition. In addition, spectra of fully deuterated forms of these same compounds have been obtained. These spectra have been interpreted in terms of the known ionic structures of the hydrates and the known spectra of oxonium and nitrate ions. Two other less stable solids were formed, a molecular hydrogen-bonded HNO3-H2O complex, stable only at temperatures below 120 and 150 K, and a substance thought to be a crystalline mixture of trihydrate and ice which sometimes formed from water-rich vapors and which upon pumping and or warming could be converted into crystalline trihydrate. While these

four substances appear to be the four species recently reported by Ritzhaupt and Devlin, their allocation of structures to two of them is disputed, in particular, their claims that a stable dihydrate exists. The relevance of the results to the "stratospheric "ozone hole" problem, as exemplified over Antarctica, is discussed. (Auth. mod.)

46-675
Mechanics of sliding of a skate along a curvilinear trajectory.
Minenkov, A.O., et al, *Mechanics of solids*, 1989, 24(2), p.109-117. Translated from Izvestiia AN SSSR. Mekhanika tverdogo tela, 1989, No.2. 3 refs.
Ostroumov, A.V.
Ice solid interface, Sliding, Ice deformation, Cracking (fracturing), Sleds, Mechanical properties, Analysis (mathematics), Brittleness.

46-676
Prospects for the measurement of ice cloud particle shape and orientation with elliptically polarized radar signals.
Matrosov, S.Y., *Radio science*, July-Aug. 1991, 26(4), p.847-856, 16 refs.
Cloud physics, Ice crystal optics, Radar echoes, Measurement, Polarization (waves), Reflectivity, Particles, Orientation, Detection, Wave propagation.

46-677
Moving loads on ice plates of [illegible] ite thickness.
Strathdee, J., et al, *Journal of fluid mechanics*, May 1991, Vol.226, p.37-61, 21 refs.
Robinson, W.H., Haines, E.M.
Ice sheets, Floating ice, Damping, Dynamic loads, Ice cover strength, Stress concentration, Ice deformation, Viscoelasticity, Analysis (mathematics), Ice water interface.

46-678
Problems in industrial activities and recultivation near the excavation of permafrost placers; collected scientific papers. [Problemy tekhnogeneza i rekul'tivatsii pri razrabotke mnogoletnemerzlykh rossypei; sbornik nauchnykh trudov].
Evsiovich, A.S., ed, Magadan, VNII-1, 1987, 93p., In Russian. For individual papers see 46-679 through 46-689.
Revegetation, Agriculture, Placer mining, Permafrost, Economic development, Cryogenic soils, Soil erosion, Environmental impact, Dredging, Tundra, Soil formation.

46-679
Geophysical azonality and principles of recultivating land disturbed by the excavation of placers in Northeastern USSR. [Geofizicheskaia azonal'nost' i printsipy rekul'tivatsii zemel', narushennykh pri razrabotke rossypei Severo-Vostoka SSSR].
Zamoshch, M.N., et al, Problemy tekhnogeneza i rekul'tivatsii pri razrabotke mnogoletnemerzlykh rossypei; sbornik nauchnykh trudov (Problems in industrial activities and recultivation near the excavation of permafrost placers; collected scientific papers). Edited by A.S. Evsiovich, Magadan, VNII-1, 1987, p.5-15, In Russian. 14 refs.
Papernov, I.M.
Revegetation, Placer mining, Environmental protection, Cryogenic soils, Tailings, Soil erosion, Excavation.

46-680
Evaluating the disturbance of river valleys and recultivation trends near the excavation of placers in the Upper Kolyma basin. [Otsenka narushenii rechnykh dolin i obosnovanie napravlenii rekul'tivatsii pri razrabotke rossypei basseina Verkhnei Kolymy].
Zamoshch, M.N., Problemy tekhnogeneza i rekul'tivatsii pri razrabotke mnogoletnemerzlykh rossypei; sbornik nauchnykh trudov (Problems in industrial activities and recultivation near the excavation of permafrost placers; collected scientific papers). Edited by A.S. Evsiovich, Magadan, VNII-1, 1987, p.16-24, In Russian. 12 refs.
Revegetation, River basins, Valleys, Placer mining, Excavation, Soil erosion, Cryogenic soils, Frozen ground temperature.

46-681
Zonal aspects of industrial activities and forecasting the bioproductivity of recultivation near the excavation of placers. [Zonal'nye aspekty tekhnogeneza i *prognoz bioproduktivnosti rekul'tivatsii pri razrabotke* rossypei].
Paiusova, E.A., et al, Problemy tekhnogeneza i rekul'tivatsii pri razrabotke mnogoletnemerzlykh rossypei; sbornik nauchnykh trudov (Problems in industrial activities and recultivation near the excavation of permafrost placers; collected scientific papers). Edited by A.S. Evsiovich, Magadan, VNII-1, 1987, p.25-30, In Russian. 4 refs.
Morozova, V.V.
Revegetation, Economic development, Placer mining, Forecasting, Cryogenic soils, Ecosystems, Biomass.

46-682
Regional characteristics of placer excavations and the recultivation of disturbed lands in the conditions of southern Yakutia. [Regional'nye osobennosti razrabotki rossypei i rekul'tivatsii narushennykh zemel' v usloviiakh IUzhnoi IAkutii].
Goncharov, IU.T., Problemy tekhnogeneza i rekul'tivatsii pri razrabotke mnogoletnemerzlykh rossypei; sbornik nauchnykh trudov (Problems in industrial activities and recultivation near the excavation of permafrost placers; collected scientific papers). Edited by A.S. Evsiovich, Magadan, VNII-1, 1987, p.31-38, In Russian. 2 refs.
Placer mining, Revegetation, Soil erosion, Cryogenic soils, Soil analysis, Dredging, Radiation balance, Heat balance.

46-683
Characteristics of recultivation in arctic and hypoarctic subzones of Western Siberia. [Osobennosti rekul'tivatsii v arkticheskoĭ i gipoarkticheskoĭ podzonakh Zapadnoĭ Sibiri].
Tvorogov, V.A., et al, Problemy tekhnogeneza i rekul'tivatsii pri razrabotke mnogoletnemerzlykh rossypei; sbornik nauchnykh trudov (Problems in industrial activities and recultivation near the excavation of permafrost placers; collected scientific papers). Edited by A.S. Evsiovich, Magadan, VNII-1, 1987, p.39-43, In Russian. 6 refs.
Neustroeva, E.A.
Revegetation, Cryogenic soils, Tundra, Vegetation.

46-684
Water regime of a recultivated dredging site. [Vodnyi rezhim rekul'tivirovannogo drazhnogo poligona].
Mikhailov, A.B., et al, Problemy tekhnogeneza i rekul'tivatsii pri razrabotke mnogoletnemerzlykh rossypei; sbornik nauchnykh trudov (Problems in industrial activities and recultivation near the excavation of permafrost placers; collected scientific papers). Edited by A.S. Evsiovich, Magadan, VNII-1, 1987, p.44-55, In Russian. 9 refs.
IAkovishina, S.K.
Revegetation, Cryogenic soils, Dredging, Hydrogeology, Soil water, Water balance, Seepage.

46-685
Evaluating the physical-chemical properties of silts in the Chukotka ice complex for their use in soil formation in mining engineering recultivation. [Otsenka fiziko-khimicheskikh svoĭstv alevritov ledovogo kompleksa Chukotki dlia ispol'zovaniia ikh v kachestve pochvoobrazuiushchikh porod na gorno-tekhnicheskoĭ rekul'tivatsii].
Motrich, L.T., Problemy tekhnogeneza i rekul'tivatsii pri razrabotke mnogoletnemerzlykh rossypei; sbornik nauchnykh trudov (Problems in industrial activities and recultivation near the excavation of permafrost placers; collected scientific papers). Edited by A.S. Evsiovich, Magadan, VNII-1, 1987, p.56-62, In Russian. 5 refs.
Revegetation, Soil formation, Sediments, Loess, Chemical properties, Physical properties, Cryogenic soils, Microelement content, Mining.

46-686
Study, optimization, and selection of the composition of the root-inhabited layer of the recultivated lands of the Northeast. [Issledovania, optimizatsiia i podbor sostava korneobitaemogo sloia na rekul'tivirovannykh zemliakh Severo-Vostoka].
Goncharov, IU.T., et al, Problemy tekhnogeneza i rekul'tivatsii pri razrabotke mnogoletnemerzlykh rossypei; sbornik nauchnykh trudov (Problems in industrial activities and recultivation near the excavation of permafrost placers; collected scientific papers). Edited by A.S. Evsiovich, Magadan, VNII-1, 1987, p.63-69, In Russian. 4 refs.
Antonenkova, M.M.
Revegetation, Roots, Agriculture, Cryogenic soils, Hydrothermal processes, Fines.

46-687
Perspectives on the use of current and relict soils in the Magadan region for recultivation. [Perspektivy ispol'zovania sovremennykh i reliktovykh pochv Magadanskoĭ *oblasti dlia rekul'tivatsii*].
Ignatenko, I.V., Problemy tekhnogeneza i rekul'tivatsii pri razrabotke mnogoletnemerzlykh rossypei; sbornik nauchnykh trudov (Problems in industrial activities and recultivation near the excavation of permafrost placers; collected scientific papers). Edited by A.S. Evsiovich, Magadan, VNII-1, 1987, p.70-76, In Russian. 4 refs.
Revegetation, Cryogenic soils, Soil analysis.

46-688
Revegetation of Chukotka tundra, disturbed by transportation. [Vosstanovlenie tundr Chukotki, narushennykh transportom].
Pavlov, B.A., et al, Problemy tekhnogeneza i rekul'tivatsii pri razrabotke mnogoletnemerzlykh rossypei; sbornik nauchnykh trudov (Problems in industrial activities and recultivation near the excavation of permafrost placers; collected scientific papers). Edited by A.S. Evsiovich, Magadan, VNII-1, 1987, p.77-87, In Russian. 11 refs.
Ignatenko, I.V.
Revegetation, Environmental impact, Tundra, Transportation.

46-689
Characteristics of reservoir recultivation in Khabarovsk territory. [Osobennosti vodokhoziaistvennoĭ rekul'tivatsii Khabarovskogo kraia].
Zaporov, A.IU., Problemy tekhnogeneza i rekul'tivatsii pri razrabotke mnogoletnemerzlykh rossypei; sbornik nauchnykh trudov (Problems in industrial activities and recultivation near the excavation of permafrost placers; collected scientific papers). Edited by A.S. Evsiovich, Magadan, VNII-1, 1987, p.88-93, In Russian. 1 ref.
Reservoirs, Revegetation, Rivers, River basins, Dredging.

46-690
Alteration of the UV-visible reflectance spectra of H2O ice by ion bombardment.
Sack, N.J., et al, *Journal of geophysical research*, Sep. 25, 1991, 96(E2), p.17,535-17,539, 26 refs.
Extraterrestrial ice, Water films, Ultraviolet radiation, Spectra, Reflectivity, Simulation, Radiation absorption, Surface roughness, Ions, Ice surface, Satellites (natural).

46-691
Studies of proton irradiated H2O + CO2 and H2O + CO ices and analysis of synthesized molecules.
Moore, M.H., et al, *Journal of geophysical research*, Sep. 25, 1991, 96(E2), p.17,541-17,545, 18 refs.
Khanna, R., Donn, B.
Extraterrestrial ice, Ice spectroscopy, Infrared radiation, Ice composition, Spectra, Molecular structure, Chemical analysis, Low temperature tests.

46-692
Constitutive rheological equation for ice.
Epifanov, V.P., *Mechanics of solids*, 1989, 24(3), p.115-122, Translated from Izvestiia AN SSSR. Mekhanika tverdogo tela, 1989, No.3. 27 refs.
Ice sheets, Ice loads, Ice creep, Cracking (fracturing), Ice strength, Mechanical properties, Ice models, Sounding, Analysis (mathematics), Rheology, Temperature effects.

46-693
Modeling of fracture of sheet ice.
Slepian, L.I., *Mechanics of solids*, 1990, 25(2), p.155-161, Translated from Izvestiia AN SSSR. Mekhanika tverdogo tela, 1990, No.2. 2 refs.
Ice sheets, Loading, Ice mechanics, Floating ice, Flexural strength, Cracking (fracturing), Mathematical models, Plates, Crack propagation.

46-694
Determination of fracture toughness (K-IC) of natural sea ice.
Danilenko, V.I., et al, *Mechanics of solids*, 1990, 25(2), p.191-195, Translated from Izvestiia AN SSSR. Mekhanika tverdogo tela, 1990, No.2. 10 refs.
Rogachko, S.I.
Sea ice, Ice loads, Cracking (fracturing), Ice hardness, Hardness tests, Viscoelasticity, Ice mechanics, Flexural strength.

46-695
Proceedings. POAC 91.
International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991, St. John's, Memorial University of Newfoundland, 1991, 1088p. (2 vols.). Refs. passim. For individual papers see 46-696 through 46-764.
Muggeridge, D.B., ed. Colbourne, D.B., ed. Muggeridge, H.M., ed.
Ice loads, Offshore structures, Ice strength, Icebreakers, Ice navigation, Icebergs, Sea ice, Ice solid interface, Offshore drilling, Ice breaking, Ice breakup, Ice pressure, Ice cracks.

46-696
Structures in ice: past experience and future challenges.
Croasdale, K.R., International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.1. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.1-27, 30 refs.
Offshore structures, Offshore drilling, Ice loads, Petroleum industry.

46-697
Design of offshore concrete structures for local loads due to ice impact.
Gerwick, B.C., Jr., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.1. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.28-42, 10 refs.
Berner, D.E.
Offshore structures, Ice loads, Impact strength, Concrete structures, Icebergs, Ice pressure.

46-698
Ice forces and ice crushing.
Palmer, A.C., International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.1. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.43-64, 22 refs.
Ice loads, Ice pressure, Ice breakup, Ice strength, Ice cracks, Offshore structures.

46-699
Ice break-up model for Northumberland Strait.
Barry, G., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.1. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.65-79, 7 refs.
Carstens, T., Croasdale, K.R., Frederking, R.M.W., Brown, T.G.
Ice breakup, Ice jams, Ice loads, Bridges, Ice pressure, Mathematical models, Ice melting.

46-700
Simulating bridge-induced ice jams.
Brown, T.G., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.1. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.80-95, 14 refs.
Poon, A.W., Tattersall, W.H., Feltham, J.A.
Bridges, Ice jams, Ice breakup, Ice conditions, Mathematical models, Ice solid interface.

46-701
Numerical simulation of ice forces on fixed structures.
Horrigmoe, G., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.1. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.96-108, 13 refs.
Danielsen, O.
Offshore structures, Ice loads, Ice models, Mathematical models, Ice mechanics, Ice solid interface.

46-702
Dynamic unloading—is it the missing link in ice crushing and ice-structure interaction modelling.
Marcellus, R.W., International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.1. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.109-125, 29 refs.
Ice loads, Offshore structures, Ice pressure, Ice relaxation, Ice models, Cracking (fracturing), Ice cracks.

46-703
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Ice cover thickness, Sounding, Electromagnetic prospecting, Ice surveys, Snow depth, Sea ice.
Field trials using a man-portable Geonics Ltd. EM31 electromagnetic induction sounding instrument with a Flow Research Inc. plug-in data processing module for the remote measurement of sea ice thickness are discussed. It was found that the instrument was capable of estimating the snow plus ice thickness to within 10% of the true value for ice from about 0.7 to 3.5 m thick. Seawater under the Arctic Ocean pack ice has a relatively uniform conductivity (2.5 +/- 0.05 S/m). Because of this, a simplified method can be used for estimating sea ice thickness using an off-the-shelf EM31 instrument. This measurement technique is also discussed.

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46-721
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46-722
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Ice (construction material), Ice strength, Ice creep, Mathematical models, Ice models, Ice loads, Viscoelasticity.

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Finite element modelling of spherical indentation tests on ice.
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46-727
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46-730
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Ship icing, Mathematical models, Design, Ships, Ice loads, Ice growth.

46-741
Power approach to investigation of ice-ship interaction.
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46-742
Fuel consumption analysis for vessels operating in pack ice.
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Alacoque, H.Y.
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46-743
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Ice navigation, Marine transportation, Mathematical models.

46-744
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Ice navigation, Propellers, Ice solid interface, Damage, Design.

46-745
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Ice solid interface, Ice navigation, Impact tests, Ice pressure, Ships, Icebreakers.

46-746
Icebreaker *Oden* in polar operations—environmental impact assessment.
Rudbäck, G.T., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.812-822, 9 refs.
Sandkvist, J., Forsman, B.
Cold weather operation, Icebreakers, Ice navigation, *Environmental impact*, *Noise (sound)*, *Pollution*.
The Swedish Polar Research Secretariat will use the new Swedish icebreaker *Oden*, operated by the National Maritime Administration, as a platform for a marine high arctic expedition in the summer of 1991. As part of the expedition planning and as a help in the decisionmaking processes involved, an environmental impact assessment has been performed in order to identify and quantify all emissions, discharges and other environmental aspects associated with polar operations. The technical study covers a broad range of different environmental aspects potentially associated with environmental impacts, both for normal operation conditions and potential risks caused by failures or accidents with the *Oden*. Two separate measurement programs, regarding the underwater noise radiation and the exhaust emissions, have been included in the study. The technical description and the quantitative analyses of the emissions, discharges etc, will be evaluated in relation to a general environmental policy formulated for all scientific and associated logistic activities in the arctic and antarctic areas. The documentation of the EIA will form a basis for operational guidelines for logistic supporting science activities. This paper gives a brief presentation of the scope, the performance and the results of the technical part of the Oden EIA project. (Auth. mod.)

46-747
Wave induced chaotic motion of bergy-bits.
Hinchey, M.J., et al, MP 2967, International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.823-835, 5 refs.
Muggeridge, D.B., Rzentkowski, G., Lever, J.H.
Icebergs, Water waves, Offshore structures, Ice solid interface, Ice mechanics, Mathematical models.
Bergy-bits in waves pose a danger to offshore oil rigs. Recently, scale models of bergy-bits were subjected to random waves in the wave tank facility at Memorial University of Newfoundland (MUN) and their motions near a model rig were recorded using a SELSPOT system. Impact statistics were generated from the data using standard procedures. In regular waves, impact behavior was found to be very sensitive to small disturbances to the berg motion, especially near its heave resonance. This is a sign of chaos. The present paper explores this phenomenon in greater detail. It uses the Liapunov characteristic exponent concept for strange attractors to theoretically explore for chaos in the wave excited motion of a spherical berg free to move in heave only. The predicted regions of chaos for the berg are found to agree qualitatively with preliminary data from a wave tank set-up.

46-748
Remote sensing of icebergs in the Barents Sea during SIZEX 89.
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Icebergs, Remote sensing, Synthetic aperture radar, Grounded ice, Pack ice.

46-749
Simulations study of ice island trajectories in the Arctic Ocean.
Li, F.C., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.848-858, 17 refs.
Sackinger, W.M.
Ice islands, Computerized simulation, Icebergs.

46-750
Iceberg movement in sea ice.
Murphy, D.L., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.859-871, 10 refs.
Venkatesh, S., Wright, G.F.
Icebergs, Sea ice, Drift, Velocity.

46-751
Long range forecast of iceberg flux across 48N: a new perspective.
Newell, J.P., International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.872-886, 18 refs.
Icebergs, Long range forecasting, Drift, Temperature effects, Air temperature.

46-752
Influence of ice covers, tidal prism of tidal inlets, Hornafjördur, Iceland.
Bruun, P., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.887-902, 24 refs.
Viggosson, G., Sigurdarsson, S.
Ice cover effect, Water intakes, Tides.

46-753
Design of an offshore evacuation system.
Cammaert, A.B., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.903-916, 5 refs.
Safety, Offshore structures, Design, Design criteria, Human factors engineering, Cold weather survival.

46-754
Automated system for monitoring mobile ice during offshore drilling operations.
Danielewicz, B.W., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.917-929, 4 refs.
Saint, S.R.
Offshore drilling, Ice floes, Drift, Ice conditions, Warning systems.

46-755
Sea ice in the China Sea and the climate change.
Deng, S.Q., et al. International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.930-938, 6 refs.
Zhang, Q.W.
Sea ice, Climatic changes, Ice forecasting, Climatic factors, Long range forecasting, Air temperature.

46-756
Experiments on hovercraft overwater stability.
Hinchey, M.J., et al. International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.939-952, 12 refs.
Sullivan, P.A.
Air cushion vehicles, Stability, Icebreakers, Water waves.

46-757
Frost-resisting and anti-seismic design of Bayuquan Port in northern China.
Liu, L.P., et al. International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.953-963, 4 refs.
Zhang, R.H.
Countermeasures, Design, Design criteria, Ports, Floating ice, Tides, Earthquakes, Frost resistance, Wharves.

46-758
Improved marine radar.
Currie, B.W., et al. International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.964-976, 6 refs.
Radar, Sea ice, Ice detection.

46-759
Extraction of ocean wave parameters from wide beam HF radar (CODAR) backscatter: application at Lumsden.
Gill, E.W., et al. International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.977-988, 13 refs.
Walsh, J.
Water waves, Backscattering, Radar, Sea ice, Analysis (mathematics).

46-760
Radar performance prediction model for iceberg detection.
Johnson, M., et al. International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.989-1003, 9 refs.
Ryan, J.P.
Icebergs, Ice detection, Radar, Mathematical models, Ice models, Sea clutter.

46-761
Comparison of Canadian and Alaskan Beaufort Sea ice scour depth data and analysis methodologies.
Marcellus, R.W., et al. International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.1004-1016, 9 refs.
Roth, D.R.
Sea ice, Ice scoring, Acoustic measurement.

46-762
Preliminary results of physical model tests of ice scour.
Paulin, M.J., et al. International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.1017-1036, 10 refs.
Lach, P.R., Poorooshasb, F., Clark, J.I.
Sea ice, Ice scoring, Models, Tests, Clays.

46-763
Nonlinear consolidation under gravity type structures.
Prasad, K.S.R., et al. International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.1037-1056, 21 refs.
Swamidas, A.S.J.
Soil compaction, Soil strength, Marine geology, Elastic properties, Settlement (structural), Offshore structures, Analysis (mathematics), Cold weather construction, Design.

46-764
Strength of fibre reinforced lightweight aggregate concrete slabs in a simulated cold ocean environment.
Swamidas, A.S.J., et al. International Conference on Port and Ocean Engineering under Arctic Conditions, 11th, St. John's, Sep. 24-28, 1991. Proceedings. POAC 91. Vol.2. Edited by D.B. Muggeridge, D.B. Colbourne, and H.M. Muggeridge, St. John's, Memorial University of Newfoundland, 1991, p.1057-1078, 17 refs.
Muste, G.T.
Concrete slabs, Concrete strength, Flexural strength, Shear strength, Steels, Plates, Cold weather construction, Ocean environments, Composite materials.

46-765
Long waves in shallow liquid under ice cover.
Marchenko, A.V., *Journal of applied mathematics and mechanics*, Aug. 1989, 52(2), p.180-183, Translated from Prikladnaia matematika i mekhanika, 1988, 7 refs.
Floating ice, Fluid dynamics, Ice water interface, Ice cover effect, Wave propagation, Subglacial observations, Analysis (mathematics), Oscillations.

46-766
Research project in cloud physics.
Wheeler, M.F.S., et al. *Weather*, Sep. 1991, 46(9), p.266-270, 3 refs.
Education, Research projects, Cloud physics, Ice crystal growth, Cloud seeding, Experimentation, Supercooling.

46-767
On ice survival tests in the Arctic, February 1991.
Dick, R.A., et al. *Transport Canada. Publication*, Mar. 1991, TP 10844E, 72p., With French summary. 6 refs.
Prior, A.D.
Cold weather survival, Ocean environments, Ice surface, Rescue equipment, Cold weather tests, Clothing, Inflatable structures, Thermal insulation, Heating, Safety.

46-768
Diffraction of plane gravitational waves by the edge of an ice cover.
Gol'dshtein, R.V., et al. *Journal of applied mathematics and mechanics*, Mar. 1991, 53(6), p.731-736, Translated from Prikladnaia matematika i mekhanika, 1989. 9 refs.
Marchenko, A.V.
Floating ice, Ice cover effect, Fluid dynamics, Wave propagation, Ice edge, Subglacial observations, Water waves, Mathematical models, Gravity, Ice water interface, Reflection.

46-769
Modeling of frost formation in a fibrous insulation slab and on an adjacent cold plate.
Tao, Y.X., et al. *International communications in heat and mass transfer*, Sep.-Oct. 1991, 18(5), p.609-618, 7 refs.
Besant, R.W., Rezkallah, K.S.
Hoarfrost, Ice growth, Thermal insulation, Vapor diffusion, Heat transfer, Ice cover effect, Plates, Layers, Mathematical models, Porous materials.

46-770
Small Stanton number axisymmetric freezing around a coolant-carrying tube.
Charach, C., et al. *International communications on heat and mass transfer*, Sep.-Oct. 1991, 18(5), p.639-657, 25 refs.
Keizman, Y., Sokolov, M.
Pipes (tubes), Liquid solid interfaces, Solidification, Phase transformations, Heat transfer, Analysis (mathematics), Stefan problem.

46-771
Effect of blowing snow and ground blizzards on millimeter wave scintillation spectra.
Sarma, A.D., et al. *International journal of infrared and millimeter waves*, Sep. 1991, 12(9), p.997-1022, 20 refs.
Hill, R.J.
Radio waves, Wave propagation, Scintillation, Blowing snow, Snowstorms, Spectra, Wind factors, Refractivity, Turbulence.

46-772
Modelling sea ice for climate studies.
Van Ypersele, J.P., Climate-ocean interaction. Edited by M.E. Schlesinger, Dordrecht, Netherlands, Kluwer Academic Publishers, 1990, p.97-123, Included in proceedings of a workshop organized jointly by NATO and the Commission of the European Communities, Oxford, UK, Sep. 26-30, 1988. Refs. p.119-123.
Air ice water interaction, Sea ice distribution, Ice models, Climatic changes, Ice cover thickness, Ice heat flux, Mathematical models, Thermodynamics, Climatology, Salinity.
This article reviews the state of the art of sea ice modelling for climatic purposes. The large variability of sea ice, its effects on atmosphere and ocean dynamics and its sensitivity to small changes in climate variables make the inclusion of an interactive sea ice model necessary in modern climate models. The ultimate sea ice model now appears to be one in which sea ice is fully coupled by heat, salt and momentum fluxes to an ocean and atmosphere model. Before discussing the elements needed in fully coupled models, the hierarchy of existing thermodynamic and dynamic models is reviewed, and the principal methods used are described. The elements needed for coupled modelling are then discussed, and examples of ocean sea ice coupled models are presented. Perspectives on possible and needed progress in sea-ice modelling are outlined. Included is a simulation of Weddell Sea ice cover thickness using thermodynamic and other variables. (Auth. mod.)

46-773
Preliminary observations on coastal sediment loss through ice rafting in Lake Michigan.
Reimnitz, E., et al. *Journal of coastal research*, 1991, 7(3), p.653-664, With French and German summary. 14 refs.
Hayden, E., McCormick, M., Barnes, P.W.
Shore erosion, Lake ice, Ice rafting, Sediment transport, Drift, Wind factors, Slush, Particle size distribution, Littoral zone, United States—Michigan, Lake.

46-774
Sea ice engineering in China.
Xu, J.Z. et al. *Journal of coastal research*, 1991, 7(3), p.759-770, With French, German and Spanish summaries. 22 refs.
Sea ice, Offshore structures, Design criteria, Engineering, Ice forecasting, Drift, Petroleum industry, China.

46-775
CNSFA Operation Order No.201.
U.S. Naval Support Force, Antarctica, Aug. 1991, var. p., 97 refs.
Military operation, Cold weather operation, Logistics, Research projects, Radio communication, Military equipment, Airborne equipment, Icebreakers, Antarctica.
This order specifies the duties of the Department of Defense military support for the United States Antarctic Program for the 1991-92 research season, and supersedes CNSFA OPORD 2-88. The primary objective of this document is the delineation of the logistical, administrative and communications responsibilities of the military contingent which supports the annual deployment of scientific resources in Antarctica. Included in the duties of this contingent whose yearly support activities are designated "Operation Deep Freeze," is the provision and coordination of air personnel and supply transport, to include the deployment of fixed wing and helicopter aircraft; the assignment, regulation and monitoring of radio frequencies to be used in all forms of radio communications, icebreaker deployment, and the provision of meteorological data critical to the operations of the scientific communi.

46-776
Vol.1.
Conference on Climate and Water, Helsinki, Finland, Sep. 11-15, 1989. *Academy of Finland. Publication*, 1989, 9/89, 520p., Refs. passim. For selected papers see 46-777 through 46-783.
Huttunen, L., ed
Climatic changes, Global change, Hydrologic cycle, Sea ice distribution, Precipitation (meteorology), Glacier oscillation, Water balance, Surface waters, Soil water, Meetings, Climatology, Meteorology, Ice melting

46-777
Variations of the sea temperature around the coasts of Finland.
Alenius, P., Conference on Climate and Water, Helsinki, Finland, Sep. 11-15, 1989, Vol.1. Edited by L. Huttunen, Helsinki, Finland, Government Printing Center, 1989, p.51-62, 11 refs.
Oceans, Sea ice distribution, Water temperature, Climatic changes, Periodic variations, Hydrography, Finland.

46-778
On climatic variations of the Baltic Sea ice conditions.
Leppäranta, M., Conference on Climate and Water, Helsinki, Finland, Sep. 11-15, 1989, Vol.1. Edited by L. Huttunen, Helsinki, Finland, Government Printing Center, 1989, p.63-72, 3 refs.
Sea ice distribution, Ice conditions, Freezeup, Ice breakup, Climatic changes, Air temperature, Ice cover thickness, Periodic variations, Climatic factors, Global warming, Baltic Sea.

46-779
Snow and ice—nonrenewable natural resources in the *future*?.
Kuusisto, E., Conference on Climate and Water, Helsinki, Finland, Sep. 11-15, 1989, Vol.1. Edited by L. Huttunen, Helsinki, Finland, Government Printing Center, 1989, p.300-318, 23 refs.
Natural resources, Ice melting, Climatic changes, Water supply, Ice (water storage), Snow cover distribution, Ice cover, Air water interactions, Air temperature, Global warming.

46-780
Influence of glacierisation on the response of runoff *from alpine basins to climate variability*.
Collins, D.N., Conference on Climate and Water, Helsinki, Finland, Sep. 11-15, 1989, Vol.1. Edited by L. Huttunen, Helsinki, Finland, Government Printing Center, 1989, p.319-328, 10 refs.
River basins, Runoff, Alpine glaciation, Precipitation (meteorology), Climatic changes, Glacier melting, Air temperature, Periodic variations.

46-781
Simulation of the effects of climate changes on a glacier in western Norway.
Laumann, T., et al, Conference on Climate and Water, Helsinki, Finland, Sep. 11-15, 1989, Vol.1. Edited by L. Huttunen, Helsinki, Finland, Government Printing Center, 1989, p.339-352, 12 refs.
Tvede, A.M.
Glacier oscillation, Climatic changes, Glacier mass balance, Simulation, Precipitation (meteorology), Glacier thickness, Global warming, Norway.

46-782
Climate variation and ice conditions in the River Torneälven.
Zachrisson, G., Conference on Climate and Water, Helsinki, Finland, Sep. 11-15, 1989, Vol.1. Edited by L. Huttunen, Helsinki, Finland, Government Printing Center, 1989, p.353-364, 5 refs.
River ice, Ice breakup, Climatic changes, Flooding, Water level, Air temperature, Periodic variations, Flood forecasting, Global warming.

46-783
Long-term trends in river flow in Finland.
Hyvärinen, V., et al, Conference on Climate and Water, Helsinki, Finland, Sep. 11-15, 1989, Vol.1. Edited by L. Huttunen, Helsinki, Finland, Government Printing Center, 1989, p.450-461, 4 refs.
Leppäjärvi, R.
River flow, Watersheds, Climatic changes, Ice melting, Hydrology, Global warming, Periodic variations, Finland.

46-784
Simulation of oil slick transport in Great Lakes connecting channels: user's manual for the microcomputer-based interactive program.
Yapa, P.D., et al, *U.S. Army Cold Regions Research and Engineering Laboratory Special report*, July 1991, SR 91-08, 31p., ADA-241 013, 3 refs.
Thomas, R.J., Jr., Rutherford, R.S., Shen, H.T.
Oil spills, Computerized simulation, River flow, Lakes, Computer programs, Ice cover effect, Great Lakes.
The growing concern over the impacts of oil spills on aquatic environments has led to the development of many computer models for simulating the transport and spreading of oil slicks in surface water. Almost all of these models were developed for coastal environments. In this study, two computer models, named ROSS and LROSS, were developed for simulating oil slick transport in rivers and lakes, respectively. This report explains how to use the microcomputer-based versions of these two models.

46-785
Depositional environment of surging sub-polar tidewater glaciers: a case study of the morphology, sedimentation and sediment properties in a surge-affected marine basin outside Nordaustlandet, the northern Barents Sea.
Solheim, A., *Oslo. Norsk Polarinstitutt. Skrifter*, 1991, No.194, 97p., Refs. p.81-84.
Glacier surges, Glacial deposits, Bottom sediment, Glacial geology, Marine deposits, Ocean environments, Bottom topography, Glacier surveys, Sediment transport, Norway Nordaustlandet.

46-786
Conversion and icebreaking performance of the Soviet icebreaker "Kapitan Sorokin".
Klinge, F., et al, 1991, 35p., 7 refs. Presented at the 11th International Conference on Port and Ocean Engineering under Arctic Conditions, St. John's Newfoundland, Sep. 24-28, 1991 (POAC 91).
Hellmann, J.H.
Icebreakers, Ice breaking, Ice navigation, Ice conditions.

46-787
Proceedings of the 59th annual meeting, Juneau, AK, *Apr. 12-15, 1991*.
Western Snow Conference, Fort Collins, Colorado State University, [1991], 156p. + appends., Refs. passim. For individual papers see 46-788 through 46-806.
Shafer, B., ed.
Global change, Global warming, Snowmelt, Runoff, Snow water equivalent, Precipitation (meteorology), Stream flow, Water supply, Snow depth, Climatic factors, Hydrology, Snow courses, Carbon dioxide, Records (extremes).

46-788
***Global change: can we detect its effect on subalpine* hydrographs.**
Troendle, C.A., *Western Snow Conference. Proceedings*, 1991, 59th, p.1-7, 13 refs.
Global change, Hydrography, Snowmelt.

46-789
Looking for evidence of climatic change in hydrometeorological time series.
Kite, G., *Western Snow Conference. Proceedings*, 1991, 59th, p.8-16, 16 refs.
Water balance, Glacial rivers, Models, Climatic changes, Hydrology, Water level, Lakes, River flow, Snowmelt.

46-790
Effect of global warming on Sierra Nevada Mountain snow storage.
Tsuang, B.J., et al, *Western Snow Conference. Proceedings*, 1991, 59th, p.17-28, 27 refs.
Dracup, J.A.
Global warming, Snowmelt, Runoff, Models, Snow water equivalent, Climatic factors, Snow temperature.

46-791
Trend of decreasing snowmelt runoff in northern California.
Roos, M., *Western Snow Conference. Proceedings*, 1991, 59th, p.29-36, 3 refs.
Runoff, Global warming, Snowmelt, Precipitation (meteorology), Carbon dioxide.

46-792
Variation of snow water equivalent and streamflow in relation to the El Niño/Southern Oscillation.
Koch, R.W., et al, *Western Snow Conference. Proceedings*, 1991, 59th, p.37-48, 13 refs.
Buzzard, C.F., Johnson, D.M.
Snow water equivalent, Stream flow, Water supply, Snow courses, Climatic factors, Precipitation (meteorology), Oscillations.

46-793
Trends in snowcourse and streamflow data in British Columbia and the Yukon.
Leith, R.M., *Western Snow Conference Proceedings*, 1991, 59th, p.49-56, 6 refs.
Snow courses, Stream flow, Snow water equivalent, Statistical analysis.

46-794
Climatology of snowfall-event characteristics at Denver.
Mahoney, J.L., *Western Snow Conference. Proceedings*, 1991, 59th, p.57-66, 5 refs.
Snowfall, Climatology, Synoptic meteorology, Weather forecasting.

46-795
Is April to July runoff really decreasing in the western United States.
Wahl, K.L., *Western Snow Conference. Proceedings*, 1991, 59th, p.67-78, 17 refs.
Runoff, Stream flow, Snowmelt.

46-796
Preliminary comparison of snowmelt models for erosion prediction.
Tarboton, D.G., et al, *Western Snow Conference. Proceedings*, 1991, 59th, p.79-90, 18 refs.
Al-Adhami, M.J., Bowles, D.S.
Snowmelt, Models, Soil erosion, Snow water equivalent, Snow depth, Runoff.

46-797
Climatic and hydrologic circumstances antecedent to mass wasting events in southeastern British Columbia.
Toews, D.A.A., *Western Snow Conference. Proceedings*, 1991, 59th, p.91-102, 17 refs.
Climatic factors, Hydrology, Landslides, Snowmelt, Rain.

46-798
Monitoring global snow cover.
Armstrong, R.L., et al, *Western Snow Conference Proceedings*, 1991, 59th, p.103-108, 29 refs.
Hardman, M.
Snow depth, Snowmelt, Remote sensing, Models, Snow cover.

46-799
Effects of sampling density on estimations of snowpack characteristics.
Cooley, K.R., et al, *Western Snow Conference. Proceedings*, 1991, 59th, p.109-118, 22 refs.
Rango, A.
Water supply, Snow depth, Snow density, Watersheds, Snow water equivalent, Aerial surveys.

46-800
Bringing federal coordination to snow surveys.
Helms, J.D., *Western Snow Conference. Proceedings*, 1991, 59th, p.119-125, Refs. passim.
Snow surveys, Legislation, History, Snow courses.

46-801
North American participation in the WMO solid precipitation measurement intercomparison.
Metcalfe, J.R., et al, *Western Snow Conference. Proceedings*, 1991, 59th, MP 2968, p.126-129, 13 refs.
Hanson, C.L., Pangburn, T., Goodison, B.E., Bates, R.
Measurement, Measuring instruments, Precipitation gages, Snowfall, Snow water equivalent.

46-802
Snow sensor data quality indexing.
Brandow, C., et al, *Western Snow Conference. Proceedings*, 1991, 59th, p.130-133, 6 refs.
Lourick, A.
Accuracy, Snow water equivalent, Data processing.

46-803
Scaled index of winter severity.
Farnes, P.E., *Western Snow Conference. Proceedings*, 1991, 59th, p.134-137.
Climatic factors, Records (extremes), Snow water equivalent, Air temperature, Precipitation (meteorology).

46-804
History of rain-on-snow floods in the Sierra Nevada.
Kattelmann, R.C., et al, *Western Snow Conference. Proceedings*, 1991, 59th, p.138-141, 8 refs.
Berg, N., McGurk, B.
Floods, Snowmelt, Rain, Records (extremes).

46-805
Western Regional Climate Center.
Redmond, K.T., *Western Snow Conference. Proceedings*, 1991, 59th, p.142-145, 1 ref.
Climatology, Organizations, Climate, Research projects, Data processing, Snow water equivalent, Snowfall.

46-806
Seasonal snowpack dynamics and chemistry in the Sierra Nevada (California, USA) and the Tien Shan (Xinjiang Province, China).
Tonnessen, K.A., et al, *Western Snow Conference. Proceedings*, 1991, 59th, p.146-149, 10 refs.
Williams, M.W., Kattelmann, R.C., Williams, M.
Snow composition, Snow hydrology, Watersheds, Snow depth.

46-807
Using the energy from an explosion to mine perenially frozen placer deposits. [Ispol'zovanie energii vzryva pri razrabotke mnogoletnemerzlykh rossypej],
Egupov, A.A., Moscow, Nedra, 1991, 224p., In Russian. 56 refs.
Blasting, Explosion effects, Placer mining, Frozen ground mechanics, Frozen ground strength, Machinery, Analysis (mathematics).

46-808
Designing mainline and industrial pipelines for strength and durability; a reference manual. [Raschet magistral'nykh i promyslovykh truboprovodov na prochnost' i ustoichivost'. Spravochnoe posobie],
Ainbinder, A.B., Moscow, Nedra, 1991, 287p., In Russian. 22 refs.
Anchors, Pipelines, Design, Design criteria, Underground pipelines, Analysis (mathematics), Frozen ground mechanics, Ground thawing, Permafrost beneath structures, Frost heave.

46-809
Methanesulfonic acid in south polar snow layers: a record of strong El Niño?.
Legrand, M., et al, *Geophysical research letters*, Feb. 1991, 18(2), p.187-190, 21 refs.
Feniet-Saigne, C.
Atmospheric composition, Snow composition, Atmospheric circulation, Antarctica—Amundsen-Scott Station.
In this paper a detailed study is presented of methanesulfonic acid (MSA) and non-sea-salt sulfate (nss-SO4) content in recent south polar precipitation. These two species are major oxidation products of dimethylsulfide (DMS) which is mainly produced by marine biota. The nss-SO4 content of south polar snow layers deposited over the 1922-1984 time period remained rather stable except for short-term increases after the Mt Agung (1963) and the El Chichon (1982) eruptions. The MSA profile also shows over the same time period several sporadic, 0.5 to 2 years, increases (2 to 10 times background level). Taking into account an uncertainty of 1-3 years in the dating of snow layers, all these MSA events seem to be correlated to major ENSO (El Niño-Southern Oscillation) events having occurred over the last sixty years. The relatively high MSA/nssSO4 weight ratios (R) observed in the corresponding snow layers suggest that these events reflect enhanced DMS emissions from the antarctic ocean. This suggested connection between ENSO and high DMS marine emissions at high southern latitudes is discussed in terms of atmospheric and oceanic circulation. (Auth.)

46-810
UV-B protecting compounds in the marine alga *Phaeocystis pouchetii* from Antarctica.
Marchant, H.J., et al, *Marine biology*, July 1991, 109(3), p.391-395, 32 refs.
Davidson, A.T., Kelly, G.J.
Algae, Chemical composition, Solar radiation, Marine biology, Antarctica—Prydz Bay.
Phaeocystis pouchetii (Hariot) Lagerheim is widely distributed in polar waters, and forms massive near-surface blooms in the marginal ice-edge zone around Antarctica during spring and summer. UV irradiance in the antarctic marine environment is reportedly as high in Oct. and Nov. as in mid-summer due to stratospheric ozone depletion. Because of the location and timing of the *P. pouchetii* bloom, this prymnesiophyte will be exposed to high levels of UV-B (280-320 nm) radiation. Colorless water-soluble compounds, produced by the colonial stage in the life cycle of this alga, absorb strongly between 250 and 370 nm, with absorbance maxima at 271 and 323 nm. The concentration of these compounds in cultured *P. pouchetii* depends on the strain, stage in the life cycle, and presence of bacteria. As well as conferring substantial protection to this alga, these substances may also provide UV protection to other organisms present in the water column. (Auth.)

46-811
Study on the natural environments of Antarctica.
Lee, B.Y., *Ocean research*, June 1991, 13(1), p.51-69, In Korean with English summary. Refs. p.68-69.
Sea ice, Meteorological data, Oceanography, Polar regions.
The climate of Antarctica is greatly influenced by the circumpolar antarctic sea, the ranges of sea ice, and ice sheets of the Antarctic. The weather of Antarctica and surrounding subpolar ocean is dominated by a tropospheric circulation system. Large temperature gradients between the cold continent and the relatively warm ocean continually create low-pressure areas (cyclones) over the ocean which travel eastward or south-eastward with the prevailing winds. The cyclones provide the mechanism for meridional exchange of cold polar air with warm moist air from lower latitudes, and thereby transport moisture into the south polar region. These characteristics of the antarctic natural environments affect the change of global environments. (Auth. mod.)

46-812
Chemical weathering in soils at Fildes Peninsula of King George Island, Antarctica.
Liu, G.N., *Antarctic research*, 1991, 3(1), p.22-29, In Chinese with English summary. 13 refs.
Soil chemistry, Weathering, Cryogenic soils, Geocryology, Antarctica—Fildes Peninsula.
Chemical analysis shows remarkable chemical weathering effects in the soils of Fildes Peninsula. Compared with the bedrock, the elements of SiO2, Al2O3, Fe2O, FeO3, MgO, CaO and Na2O have been eluviated, and K2O, H2O+, H2O-, TiO2 and P2O5, enriched. The average ratio of SiO2/Al2O3 is 4.71, which shows a weak chemical weathering property of the soils, and the ratio of SiO2/Al2O3 suggests that the longer the weathering processes, the deeper the weathering level in the soils. The chemical weathering processes on Fildes Peninsula are greater than those on the continent. The eluviating rate of Al2O3 is greater than SiO2, so that the SiO2/Al2O3 increases from base to top in a soil profile in Antarctica. The chemical proportions in soils are greatly dependent on the bedrock in which they develop. The strong cryo-disturbances destroy the horizons of the soil. The high content of H2O+ and H2O- shows significant hydration in antarctic soils. (Auth.)

46-813
Realization and features of the application of a model of the formation of melt- and rainwater runoff for *catchment areas in the forest-steppe zones in the* European territory of the USSR. [Realizatsiia i osobennosti primeneniia modeli formirovaniia talogo i dozhdevogo stoka dlia vodosborov lesostepnoĭ zony ET SSSR],
Vodolaskov, V.P., *Moscow. Ukrainskiĭ regional'nyĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1991, Vol.240, p.32-39, In Russian. 5 refs.
Mathematical models, Runoff, Snowmelt, Meltwater, Rain, Runoff forecasting.

46-814
Water balance estimate of the seasonal and annual runoff from rivers in the Pripyat' basin. [Vodnobalansovaia otsenka sezonnogo i godovogo stoka rek basseĭna Pripiatiĭ],
Galushchenko, N.G., *Moscow. Ukrainskiĭ regional'nyĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1991, Vol.240, p.40-51, In Russian. 5 refs.
Runoff, Water balance, Snowmelt, River basins, Seasonal variations.

46-815
Studying strength properties of melting ice to calculate and forecast river ice breakup in the Ukraine. [Issledovanie prochnostnykh kharakteristik taiushchego l'da dlia rascheta i prognoza vskrytiia rek Ukrainy],
Shcherbak, A.V., et al, *Moscow. Ukrainskiĭ regional'nyĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1991, Vol.240, p.51-70, In Russian. 7 refs.
Zelenskaia, M.V.
Ice breakup, River ice, Ice melting, Ice forecasting, Ice strength, Ice cover strength, Analysis (mathematics), Snow cover effect.

46-816
Comparison of the pigmentation of two strains of the Prymnesiophyte *Phaeocystis* sp.
Buma, A.G.J., et al, *Netherlands journal of sea research*, June 1991, 27(2), p.173-182, Refs. p.180-182.
Bano, N., Veldhuis, M.J.W., Kraay, G.W.
Algae, Physiological effects, Plant ecology, Antarctica—Weddell Sea.
Two strains of *Phaeocystis* sp., one isolated from the Weddell Sea region and one from the North Sea, were compared for their growth characteristics and pigmentation during growth in batch cultures. Experiments were performed starting with identical nutrient and light conditions at 2 C, 7 C and 10 C. Division rates ranged from 0.17 to 0.94/d depending on strain and temperature: the antarctic strain grew fastest at 2 C (mu=0.71/d), the strain from the North Sea at 10 C (mu=0.94/d). Growth phase, phase in the diurnal cycle and temperature influenced the 19'hexanoyloxyfucoxanthin to chlorophyll *a* ratio in both strains. Large differences in this ratio were found between flagellates and colony cells from the same strain. Despite variability within each strain, mean levels of 19'hexanoyloxyfucoxanthin were always higher in the antarctic strain. Another fucoxanthin-related pigment, 19'butanoyloxyfucoxanthin, showed the same trends during growth as 19'hexanoyloxyfucoxanthin in the antarctic strain but was undetectable in the strain isolated from the North Sea. (Auth. mod.)

46-817
Antarctic ice charts 1987-1988.
U.S. Naval Polar Oceanography Center, Washington, D.C., 1988, 99p. ADA-231 965.
Sea ice distribution, Ice conditions, Imaging, Maps, Polar regions.
This document consists of charts portraying approximately 7-day analyses of sea ice, prepared by the Naval Polar Oceanography Center, Suitland, MD. Included are ice concentrations and ice thickness (age). (Auth.)

46-818
Note and soil map of Amsterdam Island. [Notice de la carte des sols de l'ile Amsterdam],
Frenot, Y., et al, *Comité national français des recherches antarctiques. CNFRA*, 1990, No.59, 49p. + map, In French. 13 refs.
Valleix, T.
Soil surveys, Soil mapping, Chemical analysis, Amsterdam Island.
The map (on a scale of 1:25,000) and the note presented provide detailed information on Amsterdam I., with a general review of the island's environment—such as its geology, topography, climate, flora and fauna—a description of 10 units of soil and their pedologic profiles, and an account of the method used

46-819
Variations in stratospheric ozone at polar latitudes.
Borisov, O.N., et al, *Akademiia nauk SSSR. Izvestiia. Atmospheric and oceanic physics*, May 1990, 25(10), p.761-765, 13 refs.
Ozone, Stratosphere, Models, Variations.

46-820
Radiative effects of the arctic aerosol.
Dolgin, M.I., et al, *Akademiia nauk SSSR. Izvestiia. Atmospheric and oceanic physics*, May 1990, 25(10), p.779-785, 19 refs.
Karol', I.L., Rozanov, E.V.
Aerosols, Air pollution, Solar radiation.

46-821
Modeling of the atmospheric climate at the peak of the last glaciation.
Rivin, I.G., et al, *Akademiia nauk SSSR. Izvestiia. Atmospheric and oceanic physics*, July 1990, 25(12), p.911-917, 21 refs.
Turikov, V.G.
Climatology, Paleoclimatology, Atmospheric circulation, Models.
Results obtained from three-dimensional modeling of the atmospheric climate 18,000 years ago with allowance for seasonal variations are presented. CLIMAP data are used for lower boundary conditions. A brief description of the hydrodynamic model that is used is presented. The zonal-average fields and global-mean series of atmospheric characteristics for the present-day climate and the peak of the last glaciation are presented. The results are compared with empirical data and results obtained by other investigators. The global range in this study extends through both polar regions. (Auth.)

46-822
Interim specifications for transportation materials and methods of sampling and testing. Part II. Interim test methods 1991.
American Association of State Highway and Transportation Officials, Washington, D.C., 1991, 122p., Refs. passim. For selected chapters see 46-823 and 46-824.
Construction materials, Building codes, Tests, Bitumens, Concretes, Soil tests.

46-823
Soundness of aggregates by freezing and thawing.
American Association of State Highway and Transportation Officials, Interim specifications for transportation materials and methods of sampling and testing. Part II. Interim test methods 1991, Washington, D.C., 1991, p.24-26, 3 refs.
Soil aggregates, Freeze thaw tests, Soil tests, Building codes.

46-824
Air-entraining admixtures for concrete.
American Association of State Highway and Transportation Officials, Interim specifications for transportation materials and methods of sampling and testing. Part II. Interim test methods 1991, Washington, D.C., 1991, p.44-47, 21 refs.
Air entrainment, Concrete admixtures, Freeze thaw tests, Building codes.

46-825
Open water performance of the conical drilling unit—Kulluk.
Wright, B.D., et al, 1991, 16p., 6 refs. Presented at the 11th International Conference on Port and Ocean Engineering under Arctic Conditions, St. John's Newfoundland, Sep. 24-28, 1991 (POAC 91).
Browne, R.P.
Offshore drilling, Offshore structures, Ice conditions, Floating structures, Ocean waves.

46-826
Interim specifications for transportation materials and methods of sampling and testing. Part I. Specifications 1991.
American Association of State Highway and Transportation Officials, Washington, D.C., 1991, 134p., Refs. passim. For selected chapter see 46-827.
Construction materials, Building codes, Specifications, Bitumens, Concretes, Steels, Bridges, Pipes (tubes).

46-827
Structural steel for bridges.
American Association of State Highway and Transportation Officials, Interim specifications for transportation materials and methods of sampling and testing. Part I. Specifications 1991, Washington, D.C., 1991, p.72-78, 18 refs.
Steels, Bridges, Building codes, Specifications, Cold weather performance.

46-828
On the mean atmospheric circulation over Antarctica.
Egger, J., *Geophysical and astrophysical fluid dynamics*, July 1991, 58(1-4), p.75-90, 13 refs.
Polar atmospheres, Atmospheric circulation, Wind direction, Topographic effects, Atmospheric pressure, Fluid dynamics.
The south-easterly surface flow down the slopes of Antarctica induces a transfer of westerly angular momentum to the atmosphere, which must be removed from the antarctic domain by atmospheric transports. It is suggested that synoptic eddies protruding from the northern barochnic zone into the polar regions are modified by the topography such that they are able to perform these meridional transports. A simple linear two-layer model of the axisymmetric circulation of Antarctica is presented where the eddy effects are incorporated via a K-ansatz. It is shown that qualitatively realistic mean flow patterns can be obtained with this model. The limitations of this approach are exposed. (Auth.)

46-829
Mesoscale cyclogenesis over the southwestern Ross Sea linked to strong katabatic winds.
Bromwich, D.H., *Monthly weather review*, July 1991, 119(7), p.1736-1752, 36 refs.
Polar atmospheres, Atmospheric disturbances, Ice air interface, Wind direction, Boundary layer, Atmospheric circulation, Air masses, Atmospheric pressure, Antarctica—Ross Sea.
Two years of automatic weather station (AWS) observations and satellite images have been used to study mesoscale cyclogenesis along the Transantarctic Mountains. Twice-daily regional sea-level pressure analyses revealed the frequent formation of mesoscale cyclones adjacent to two regions where the discharge of cold boundary-layer air from East Antarctica is concentrated: near Terra Nova Bay/Franklin I. and Byrd Glacier. Between one and two new vortices on average formed each week in the former location with weak frequency maxima in Dec.-Mar. and Aug.-Sep. There was a large difference between the cyclogenetic activity in the two years. The AWS array expanded in 1985 and resolved another cyclogenetic area near Byrd Glacier. This feature was half as active as the Franklin I. area and exhibited many of the same characteristics. About half of the Byrd Glacier cyclones developed simultaneously with vortices near Franklin I. These developments are the result of a dry baroclinic process, with marked barochinicity and weak cyclonic vorticity appearing to be boundary-layer prerequisites. There is little consistent upper-air support associated with the cyclogeneses, but such factors often play a key role in subsequent storm evolution. The evidence suggests that synoptic forcing plays a significant genetic role via troughs attached to, but ahead of, maritime cyclones centered to the northwest of the Ross Sea. (Auth.)

46-830
Denting analysis of ring stiffened cylindrical shells.
Hoo Fatt, M.S., et al, *International journal of offshore and polar engineering*, June 1991, 1(2), p.137-145, 19 refs.
Wierzbicki, T.
Shells, Loads (forces), Deformation, Impact, Engineering, Structural analysis, Offshore structures, Ice solid interface, Analysis (mathematics), Ice scoring.

46-831
Development of a radar for crevasse detection.
Suitz, T., et al, International Symposium on Noise and Clutter Rejection in Radars and Imaging Sensors, 1989. Proceedings. Edited by T. Suzuki, H. Ogura and S. Fujimura, [IEICE,] 1989, p.666-669, 2 refs.
For another version see 45-3068 or G-44277.
Experimentation, Crevasse detection, Radar echoes, Polar regions.
A new radar to detect a crevasse was developed. The characteristics of the instrument are shown. A preliminary experiment to measure the distances of four targets made of plywood board was made in an anechoic chamber to confirm the fundamental characteristics of the radar. Another preliminary experiment to detect a hole dug in a snow pile was made to find out the usefulness of this radar for crevasse detection. A basic experiment to examine scattering characteristics of an actual crevasse, whose location is well known in Antarctica, is planned. (Auth. mod.)

46-832
Sea ice thickness measurement using step frequency radar.
Uratsuka, S., et al, International Symposium on Noise and Clutter Rejection in Radars and Imaging Sensors, 1989. Proceedings. Edited by T. Suzuki, H. Ogura and S. Fujimura, [IEICE,] 1989, p.656-661, 11 refs.
Okamoto, K., Nishio, F., Mineno, H., Mae, S.
Sea ice, Remote sensing, Ice cover thickness, Radar echoes, Antarctica—Showa Station.
Ground based experiments of UHF step frequency radar were carried out on the sea ice near Showa Station. These are the first experiments to measure sea ice thickness using a step frequency radar system. The echoes from snow/ice and ice/water interfaces were detected. The snow depth and ice thickness are in good agreement with direct measurement of the drill hole. (Auth.)

46-833
Development of a short pulse radar for crevasse detection.
Suitz, T., et al, *Communications Research Laboratory*, Dec. 1989, 35(177), p.545-549, In Japanese with English summary. 6 refs.
Uratsuka, S., Okamoto, K., Watanabe, O., Nishio, F.
Experimentation, Crevasse detection, Radar echoes, Polar regions.
Since 1987, the Communication Research Laboratory (CRL) has been developing a new radar system for the detection of hidden crevasses in conjunction with the National Institute of Polar Research (NIPR). The CRL radar employs a very short C-band pulse (1 ns) together with a pencil beam antenna which can be scanned over the snow surface by changing the azimuth and elevation (or incidence) angles. The antenna is mounted on the top of a snowmobile with the transmitter, receiver and signal processor being placed inside. The purpose is to remotely detect hidden crevasses in front of the snowmobile by transmitting a short pulse to the snow surface and detecting and analyzing the echo signals with range-gate methods. The characteristics of the instrument and results of a preliminary experiment to confirm the characteristics of the radar are shown. (Auth.)

46-834
Ice-structure interaction.
Jones, S.J., ed, International Union of Theoretical and Applied Mechanics/International Association for Hydraulic Research (IUTAM/IAHR) Symposium, St. John's, Newfoundland, Aug. 14-17, 1989, Berlin, Springer-Verlag, 1991, 738p., Refs. passim. For individual papers see 46-835 through 46-867.
McKenna, R.F., ed, Tillotson, J., ed, Jordaan, I.J., ed.
Ice loads, Ice strength, Ice deformation, Ice solid interface, Ice breaking, Ice creep, Ice cracks, Ice pressure, Offshore structures, Icebreakers, Ice friction.

46-835
Creep and rupture in relation to field experiments.
Ponter, A.R.S., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.3-20, 21 refs.
Cocks, A.C.F.
Ice creep, Ice deformation, Ice loads, Ice strength, Ice solid interface, Ice cracks, Analysis (mathematics).

46-836
Use of tertiary creep rates in ice at high strains in compression and shear.
Jacka, T.H., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.21-[illegible], 25 refs.
Budd, W.F.
Ice creep, Ice deformation, Ice pressure, Ice strength, Ice crystals, Glacier flow, Compressive properties, Shear strain, Ice sheets.

46-837
Creep and settlement of ice structures—a case history.
Masterson, D.M., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.37-54, 10 refs.
Smith, T.
Ice cover strength, Ice creep, Ice islands, Ice (construction material), Artificial freezing, Drilling, Ice roads, Analysis (mathematics), Lake ice.

46-838
Creep constitutive equations for polycrystalline ice and effect of microcracking.
Duval, P., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.55-67, 24 refs.
Kalifa, P., Meyssonnier, J.
Ice creep, Ice deformation, Ice crystals, Ice strength, Ice microstructure, Ice cracks.

46-839
Kinetics of microcracking and dilatation in polycrystalline ice.
Sinha, N.K., IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.69-87, 24 refs.
Ice creep, Ice deformation, Ice cracks, Ice crystals, Ice loads, Ice strength, Ice microstructure, Mathematical models, Ice solid interface.

46-840
Fracture mechanics models of ice-structure interaction.
Palmer, A.C., IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.93-107, 25 refs.
Ice deformation, Ice strength, Ice cracks, Ice solid interface, Ice loads, Ice models, Fracturing, Ice plasticity, Ice elasticity, Ice breaking.

46-841
Fracture toughness of ice.
Dempsey, J.P., IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.109-145, 82 refs.
Ice strength, Ice deformation, Ice cracks, Fracturing, Ice breaking, Ice solid interface, Ice loads, Analysis (mathematics), Ice elasticity.

46-842
Study of fracture toughness of Bohai Sea ice.
Shen, W., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.148-164, 28 refs.
Lin, S.Z., Gu, P., Zhou, X.A.
Ice strength, Ice loads, Ice deformation, Ice cracks, Fracturing, Ice breaking, Sea ice, Ice solid interface, Analysis (mathematics).

46-843
Tensile and compressive fracture of ice.
Schulson, E.M., IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.165-187, 36 refs.
Ice strength, Ice deformation, Ice cracks, Ice pressure, Fracturing, Tensile properties, Analysis (mathematics).

46-844
Models for the deformation behavior of viscoelastic media with distributed damage and their applicability to ice.
Schapery, R.A., IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.191-230, 33 refs.
Ice deformation, Ice pressure, Ice creep, Viscoelasticity, Ice loads, Ice strength, Ice cracks, Ice crystals, Ice models, Mathematical models.

46-845
Microfracture and the compressive failure of polycrystalline ice.
Cole, D.M., MP 2969, IUTAM IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.231-249, 21 refs.
Ice deformation, Ice cracks, Ice pressure, Ice strength, Ice crystals, Ice microstructure.
This paper discusses strain rate and grain size effects on the process of microcrack nucleation in freshwater polycrystalline ice. It also examines crack nucleation mechanisms that are likely to operate under conditions of practical concern. Special attention is paid to the ductile-to-brittle transition and the role of grain size in the transition region. Experimental results on granular ice having bonded end caps revealed that there was a distinct beginning and end to the crack nucleation stage prior

to brittle compressive failure. Straining at a rate of 001 s generated a population of stable microcracks over a certain range of stress, after this nucleation stage, the specimen continued to sustain increased loading up to the point of failure without extension of the existing cracks or nucleation of additional cracks.

46-846
Some questions on ice and ice cover fracture in compression.
Gol'dshtein, R.V., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.251-266, 24 refs.
Osipenko, N.M.
Ice strength, Ice pressure, Ice breaking, Ice cracks, Ice deformation, Fracturing, Mathematical models, Ice loads.

46-847
Seasonal compressive strength of Beaufort Sea ice sheets.
Timco, G.W., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.267-282, 10 refs.
Frederking, R.M.W.
Ice cover strength, Ice pressure, Ice loads, Sea ice, Offshore structures, Ice solid interface, Mathematical models.

46-848
Processes of deformation and fracture of ice in compression.
Jordaan, I.J., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.283-309, 36 refs.
McKenna, R.F.
Ice strength, Ice pressure, Ice breaking, Ice deformation, Ice cracks, Ice loads, Ice solid interface, Mathematical models.

46-849
Plasticity model for the crushing of ice.
Dorris, J.F., IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.311-337, 12 refs.
Ice strength, Ice plasticity, Ice pressure, Ice breaking, Ice deformation, Ice cracks, Ice loads, Ice solid interface, Mathematical models.

46-850
Strength and failure modes of pure ice and multiyear sea ice under triaxial loading.
Murrell, S.A.F., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.339-361, 36 refs.
Sammonds, P.R., Rist, M.A.
Ice strength, Ice pressure, Ice loads, Ice cracks, Ice models, Ice solid interface, Impact tests, Penetration tests, Sea ice.

46-851
Sea ice under complex stress states: constitutive modelling and testing.
Häusler, F.U., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.363-381, 42 refs.
Matthies, H.G., Moore, C.S.
Ice cover strength, Ice loads, Ice deformation, Ice solid interface, Sea ice, Ice models, Mathematical models.

46-852
Mechanisms of ice friction.
Mölgaard, J., IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.385-403, 30 refs.
Ice friction, Ice solid interface, Ice deformation, Ice adhesion, Ice melting.

46-853
Crushing friction experiments on freshwater ice.
Gagnon, R.E., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.405-421, 8 refs.
Mölgaard, J.
Metal ice friction, Ice loads, Ice breaking, Ice navigation, Ice solid interface.

46-854
Do cracks reduce thermal ice stresses.
Fransson, L.A., IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan Berlin, Springer-Verlag, 1991, p.423-435, 7 refs.
Ice cracks, Thermal stresses, Ice loads, Ice thermal properties, Thermal expansion, Ice solid interface.

46-855
Statistical analysis of ice forces.
Sanderson, T.J.O., IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.439-457, 13 refs.
Ice loads, Ice cover strength, Ice breaking, Ice solid interface, Ice floes, Statistical analysis.

46-856
Probabilistic determination of iceberg collision design loads for floating production vessels.
Fuglem, M.K., et al, MP 2970, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.459-482, 21 refs.
Duthinh, D., Lever, J.H., Jordaan, I.J.
Ice loads, Icebergs, Floating structures, Ice solid interface, Impact strength, Design criteria, Statistical analysis.
A probabilistic method is presented for estimating global iceberg collision design loads for floating production vessels. Preliminary design loads are estimated for a concrete semi-submersible at the Terra-Nova site on the northeast part of the Grand Banks. A large number of simulated iceberg collision loads are determined using Monte Carlo techniques to choose the required input parameters (such as iceberg size and collision velocity) from estimated distributions. Using the probability distribution of these loads and the estimated frequency of iceberg collisions, design loads corresponding to probabilities of excess of .001 and .0001 per year are estimated. The results are presented as curves giving the design load as a function of the success of the operators in detecting and avoiding icebergs.

46-857
Selection of design ice loads and design ice features for fixed structures in the Beaufort Sea.
Nessim, M., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.483-506, 22 refs.
Jordaan, I.J.
Ice loads, Offshore structures, Ice solid interface, Design criteria, Statistical analysis.

46-858
Structural risk model of arctic shipping.
Daley, C.G., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.507-540, 31 refs.
Ferregut, C., Brown, R.
Ice navigation, Ice loads, Ice solid interface, Marine transportation, Safety, Statistical analysis.

46-859
Probabilistic ice forces on offshore structures.
Nevel, D.E., IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.541-557, 17 refs.
Ice loads, Offshore structures, Ice solid interface, Statistical analysis.

46-860
Ice interaction with structures.
Määttänen, M.P., IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.563-579, 44 refs.
Ice loads, Offshore structures, Ice solid interface.

46-861
Adjusting local stiffness for improving dynamic ice-structure interaction of Bohai jackets.
Xu, J.Z., et al, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.581-593, 3 refs.
Wang, L.Y.
Ice loads, Offshore structures, Ice solid interface, Ice control, Damping, Analysis (mathematics), Flexural strength.

46-862
Theoretical modelling of ice-structure interaction.
Riska, K., IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.595-618, 18 refs.
Ice loads, Ice solid interface, Ice breaking, Ice models, Mathematical models, Offshore structures, Icebreakers.

46-863
Ice-structure interaction during indentation tests.
Sodhi, D.S., MP 2971, IUTAM/IAHR Symposium, St. John's, Newfoundland, 1989. Ice-structure interaction. Edited by S.J. Jones, R.F. McKenna, J. Tillotson, and I.J. Jordaan, Berlin, Springer-Verlag, 1991, p.619-640, 17 refs.
Ice loads, Ice solid interface, Ice breaking, Impact tests, Penetration tests, Ice deformation, Ice strength.
To study dynamic ice-structure interaction during crushing failure of ice, indentation tests were conducted by pushing a vertical, flat indentor into the edges of floating ice sheets. The indentor was supported on three load cells to measure interaction forces at the interface. The displacements of the carriage and the indentor were measured separately. These measurements provided comprehensive data on the dynamic ice-structure interaction during crushing failure of an ice sheet. Three basic modes of ice behavior were observed: creep deformation at low velocities, intermittent crushing at intermediate velocities, and continuous crushing at high velocities. Based on these measurements, a theoretical model is proposed which produces results similar to those of the experiments.

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Metge, M.
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Stern, F.
Icebreakers, Ice breaking, Ice solid interface, Ice models, Test chambers, Analysis (mathematics), Ice loads.

46-866
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Lever, J.H.
Icebreakers, Ice breaking, Ice solid interface, Metal ice friction, Ice models, Test chambers, Analysis (mathematics).
A dimensional analysis of the problem of vessels transiting level continuous ice is presented. Resistance is divided into components and each is analyzed to identify dimensionless terms relevant to the individual component. These expressions provide a framework for scaling ship-ice model test results. A workable subset of scaling requirements for a three-component division of the problem is derived from the general case. Some experimental results are presented demonstrating the utility of the

method. It is shown that it may be possible to compensate for poor scaling in ice properties by scaling each component based on its own law of similitude.

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Ice sheets, Ice melting, Air temperature, Mass balance, Greenland.

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Venzke, J.F., *Polarforschung*, 1989(Pub. 1991), 59(3), p.199-201, In German With English summary. 5 refs.
Research projects, Permafrost, USSR—Siberia.

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Solomon, S.
Air temperature, Heat sources, Stratosphere, Hydrogen.

46-875
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Gavril'ev, P.P., Novosibirsk, Nauka, 1991, 183p., In Russian. Refs. p.173-181.
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46-876
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Kambiev, M.M.
Cloud droplets, Crystal growth, Freezing, Cloud physics.

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46-880
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160,000 years record of isotope temperature and atmospheric CO2 from Vostok ice core.
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Ice cores, Paleoclimatology, Carbon dioxide, Climatic changes, Atmospheric composition, Ice composition, Isotope analysis, Antarctica—Vostok Station.
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46-896
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Geocryology, Frozen ground strength, Permafrost, Frozen rocks, Land development, Classifications, Cryogenic soils, Soil water, Analysis (mathematics), Ground thawing, Frozen ground mechanics, Frozen ground settling, Thermokarst development.

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Classifications, Artificial ice, Ice formation.

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Ice elasticity, Ice composition, Ice structure, Analysis (mathematics).

46-911
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46-913
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Taliks, Permafrost hydrology.

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Ground water, Unfrozen water content, Geocryology, Hydrogeology, Artesian water.

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Thermokarst development, Littoral zone.

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Tectonics, Geocryology.

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46-935
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46-936
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46-937
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46-941
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46-944
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Radio-echo soundings of sub-polar glaciers with low-frequency radar.
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Present-day periglacial activity in the Natal Drakensberg, southern Africa: a short review.
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46-954
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46-955
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Grosso, S.A., et al, *Permafrost and periglacial processes*, Jan.-Mar. 1991, 2(1), p.49-58, With French summary. 16 refs.
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46-956
Global solar radiation, soil temperature and permafrost in the Central Andes, Argentina: a progress report.
Schrott, L., *Permafrost and periglacial processes*, Jan.-Mar. 1991, 2(1), p.59-66, With French summary. 19 refs.
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46-957
Odd nitrogen removal on background sulfate aerosols: implications for the ozone hole.
Pitari, G., et al, *Geophysical research letters*, Oct. 1991, 18(10), p.1853-1856, 17 refs.
Visconti, G.
Atmospheric composition, Ozone, Aerosols, Clouds (meteorology).
A sensitivity study is carried out for the dependence of the polar ozone loss rate on the value of the sticking coefficient *gamma* for the reaction converting odd nitrogen into nitric acid on sulfate aerosols. In this study the authors use a 2D model including nitrogen and chlorine families along with an explicit condensation mechanism for polar stratospheric clouds (PSC) and a fixed distribution of background sulfate aerosols in the lower stratosphere. If only background aerosols are included, negligible changes in total ozone are observed (up to about 1%) when *gamma* is increased from 0.02 to 0.14. If PSCs are added the same test produces a significant reduction of the ozone hole depth in Antarctica. (Auth.)

46-958
Homogeneous freezing nucleation of stratospheric solution droplets.
Jensen, E.J., et al, *Geophysical research letters*, Oct. 1991, 18(10), p.1857-1860, 12 refs.
Toon, O.B., Hamill, P.
Homogeneous nucleation, Freezing rate, Atmospheric composition, Stratosphere.
The classical theory of homogeneous nucleation is used to calculate the freezing rate of sulfuric acid solution aerosols under stratospheric conditions. The freezing of stratospheric aerosols is important for the nucleation of nitric acid trihydrate particles in the arctic and antarctic stratospheres. In addition, the rate of heterogeneous chemical reactions on stratospheric aerosols may be very sensitive to their state. The calculations indicate that homogeneous freezing nucleation of pure water ice in the stratospheric solution droplets would occur at temperatures below about 192 K. However, the physical properties of H2SO4 solution at such low temperatures are not well known, and it is possible that sulfuric acid aerosols will freeze out at temperatures ranging from about 180-195 K. It is also shown that the temperature at which the aerosols freeze is nearly independent of their size. (Auth.)

46-959
HCl dissolved in solid mixtures of nitric acid and ice: implications for the polar stratosphere.
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Atmospheric composition, Stratosphere, Clouds (meteorology), Ice crystals.

46-960
Relationship of springtime ozone depletion at Arrival Heights, Antarctica, to the 70 hPa temperatures.
Nichol, S.E., et al, *Geophysical research letters*, Oct. 1991, 18(10), p.1865-1868, 15 refs.
Coulmann, S., Clarkson, T.S.
Ozone, Stratosphere, Air temperature, Antarctica—Arrival Heights.
The total ozone measurements from Arrival Heights (78S) show severe depletion occurring in 1989 and 1990, with the minimum ozone values of 164 and 144 Dobson Units (DU) being measured in early Oct. These depletions represent the loss of about half of the total ozone column. Much milder ozone depletion was observed in the 1988 spring, with the minimum of 217 DU being observed on Sep. 23. The ozone depletion mechanism is linked to the occurrence of polar stratospheric clouds, and hence with low temperatures in the lower stratosphere in early spring. The Arrival Heights data show a shift in the ozone-temperature relationship over the last three years, with the same total ozone values associated with progressively higher temperatures from year to year. (Auth.)

46-961
Prolonged enhancement of surface ultraviolet radiation during the antarctic spring of 1990.
Frederick, J.E., et al, *Geophysical research letters*, Oct. 1991, 18(10), p.1869-1871, 9 refs.
Alberts, A.D.
Ultraviolet radiation, Ozone, Antarctica—Antarctic Peninsula, Antarctica—Palmer Station.
Measurements of the ultraviolet solar spectral irradiance from the earth's surface at Palmer Station show behavior in the spring of 1990 which differs from that observed during the seasonal ozone depletions of the previous two years. As the austral spring progresses, the sun rises in the sky, and the duration of daylight increases up to the summer solstice on Dec. 21. This is naturally accompanied by increasing ultraviolet irradiances irrespective of the behavior of column ozone. If, as in 1988, the ozone depletion is confined to Oct. and early Nov., the irradiances at local noon may remain at or below values characteristic of an unperturbed summer solstice. However, in 1990 enhanced irradiances persisted well into Dec. The largest values observed at a wavelength of 306.5 nm were approximately double those expected at summer solstice with an unperturbed ozone amount. (Auth.)

46-962
Loss of CF2O on ice, NAT, and sulfuric acid solutions.
Hanson, D.R., et al, *Geophysical research letters*, Sep. 1991, 18(9), p.1699-1701, 17 refs.
Ravishankara, A.R.
Ice composition, Chemical composition, Laboratory techniques.

46-963
Polar ice cores and climate history.
Peel, D.A., *Weather*, Apr. 1991, 46(4), p.95-102, 6 refs.
Climatic changes, Ice cores.
The value of ice cores as depictors of past climates is reviewed in terms of the origin of ice core records; the evidence they hold of past climates; the cause and effect evidence of climate and glacial cycles; rapid fluctuations of climate during the last ice age; and future prospects. Ice cores from both Antarctica and Greenland are used as the basis of the discussion.

46-964
Global warming and Antarctica.
King, J.C., *Weather*, Apr. 1991, 46(4), p.115-120, 16 refs.
Climatic changes, Sea ice, Atmospheric composition, Models.
Simulations of equilibrium climate response to increased CO2 concentrations suggest that the greatest observed warming will occur in the polar regions. Examination of temperature and sea-ice records from Antarctica shows no evidence for enhanced warming. However, the records are short and show much interannual variability, making detection of small trends very difficult. Furthermore, recent simulations of the transient effects of a steady increase in CO2 concentration suggest that the thermal inertia of the southern ocean will delay the onset of warming in Antarctica. (Auth.)

46-965
Investigation of buried snowbank ice in ice-rich permafrost in central and northern Yukon, Canada.
Pollard, W.H., *Bulletin of glacier research*, Apr. 1991, No.9, p.1-7, 21 refs.
Ground ice, Snow ice, Permafrost structure, Ice formation, Stratigraphy, Permafrost origin, Geomorphology, Canada—Yukon Territory.

46-966
Characteristics of winter precipitation and its effect on glaciers in the Nepal Himalaya.
Seko, K., et al, *Bulletin of glacier research*, Apr. 1991, No.9, p.9-16, 9 refs.
Takahashi, S.
Glacier mass balance, Glacier oscillation, Snowfall, Precipitation (meteorology), Air temperature, Meteorological factors, Nepal.

46-967
Ice flow of Glacier AX010 in the Nepal Himalaya.
Ikegami, K., et al, *Bulletin of glacier research*, Apr. 1991, No.9, p.17-22, 7 refs.
Ageta, Y.
Glacier mass balance, Glacier flow, Glacier thickness, Glacier surveys, Nepal.

46-968
Glaciological studies on Qingzang Plateau, 1989. Part 1. Outline of the project.
Yao, T.D., et al, *Bulletin of glacier research*, Apr. 1991, No.9, p.23-26, 1 ref.
Ageta, Y., Ohata, T.
Glacier surveys, Mountain glaciers, Alpine glaciation, Glacial hydrology, Glacial meteorology, Expeditions, China—Qinghai-Xizang Plateau.

46-969
Glaciological studies on Qingzang Plateau, 1989. Part 2. Glaciology and geomorphology.
Ageta, Y., et al, *Bulletin of glacier research*, Apr. 1991, No.9, p.27-32, 1 ref.
Glacier surveys, Mountain glaciers, Glacier formation, Glacier oscillation, Paleoclimatology, China—Qinghai-Xizang Plateau.

46-970
Glaciological studies on Qingzang Plateau, 1989. Part 3. Meteorology and hydrology.
Ohata, T., et al, *Bulletin of glacier research*, Apr. 1991, No.9, p.33-49, 4 refs.
Glacier surveys, Mountain glaciers, Glacial meteorology, Glacial hydrology, China—Qinghai-Xizang Plateau.

46-971
Outline of glaciological studies in the Nepal Himalaya, 1989.
Yamada, T., *Bulletin of glacier research*, Apr. 1991, No.9, p.51-54.
Glacier surveys, Mountain glaciers, Glacier oscillation, Expeditions, Nepal.

46-972
Dating of an ice core from the Höghetta ice dome in Spitsbergen by Pb-210 analysis.
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Osada, K., Fujii, Y.
Ice cores, Ice dating, Isotope analysis, Ice growth, Paleoclimatology, Norway—Spitsbergen.

46-973
Organic acids and aldehydes in the ice samples from Site-J, Greenland.
Kawamura, K., et al, *Bulletin of glacier research*, Apr. 1991, No.9, p.59-63, 13 refs.
Yasui, O.
Ice sampling, Ice composition, Impurities, Ice cores, Chemical analysis, Greenland.

46-974
Lipid class compounds in the Greenland ice core samples: a preliminary result.
Kawamura, K., et al, *Bulletin of glacier research*, Apr. 1991, No.9, p.65-70, 16 refs.
Suzuki, I.
Ice cores, Impurities, Ice composition, Chemical analysis, Air pollution, Greenland.

46-975
Methanesulfonic acid and major ions in the ice core from Site-J, Greenland.
Suzuki, K., et al, *Bulletin of glacier research*, Apr. 1991, No.9, p.71-76, 8 refs.
Ice cores, Impurities, Ice composition, Chemical analysis, Air pollution, Greenland.

46-976
Preliminary results of structural analyses of an 85.6 m deep ice core retrieved from Höghetta ice dome in northern Spitsbergen, Svalbard.
Kawamura, T., et al, *Bulletin of glacier research*, Apr. 1991, No.9, p.77-83, 13 refs.
Kameda, T., Izumi, K.
Ice cores, Ice structure, Paleoclimatology, Structural analysis, Ice temperature, Norway—Spitsbergen.

46-977
Accumulation rate at Site-J and Dye-2, Greenland.
Shoji, H., et al, *Bulletin of glacier research*, Apr. 1991, No.9, p.85-88, 5 refs.
Clausen, H.B., Kameda, T.
Ice cores, Ice growth, Ice dating, Greenland.

46-978
Application of wet deicing salt in winter maintenance; potential savings and recommendations. [Feuchtsalz-Anwendung im Strassenwinterdienst; Einsparungsmöglichkeiten und Anwedungsempfehlungen]
Hanke, H., *Strasse und Autobahn*, May 1991, 42(5), p.250-258, In German. 12 refs.
Chemical ice prevention, Road maintenance, Salting, Winter maintenance.

46-979
Durability of asphalt roads influenced by climate. [Die Dauerhaftigkeit von Asphaltstrassen unter Berücksichtigung des Klimas]
Arand, W., *Strasse und Autobahn*, Feb. 1991, 42(2), p.80-88, In German. 12 refs.
Pavements, Frost resistance, Bitumens, Road maintenance, Cold weather performance.

46-980
Satellite remote sensing of polar regions; applications, limitations and data availability.
Massom, R.A., London, Bellhaven Press; Boca Raton, FL, Lewis Publishers, 1991, 307p., Refs. passim.
Polar regions, Remote sensing, Spacecraft, LANDSAT, Data processing, Sea ice, Icebergs, Ice sheets, Ice shelves.
This is a comprehensive overview of the current technology and practice in satellite remote sensing of polar regions. It is presented in two parts; the first covers history, general principles, data processing techniques, and future developments. Part II gives operational data on past, present and future satellites in this program. The author illustrates with sample data from various polar regions, including the Weddell Sea, Queen Maud Land, and Antarctica as a whole.

46-981
History of the geocryological study of Western Siberia. [Istoriia geokriologicheskogo issledovaniia Zapadnoĭ Sibiri]
Mel'nikov, V.P., ed, Novosibirsk, Nauka, 1990, 268p. + map, In Russian. Refs. p.192-256.
Solov'eva, L.N., ed.
Geocryology, Bibliographies, History, USSR - Siberia.

46-982
Determining snow conditions and snow distribution by storms in the eastern part of the South-Georgian highland. [Otsenka snezhnosti i metelevogo perenosa snega v vostochnoĭ chasti IUzhno-Gruzinskogo nagor'ia]
Tsomaia, V.Sh., *Zakavkazskiĭ regional'nyĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1990, Vol.87(94), p.120-133, In Russian. 2 refs.
Snow accumulation, Snow cover distribution, Snowstorms, Snow surveys, Statistical analysis.

46-983
Statistical structure of the snow cover field and improvement of snow surveying techniques in the mountains of the Northern Caucasus. [Statisticheskaia struktura polia snezhnogo pokrova i ratsionalizatsiia snegomernykh rabot v gorakh Severnogo Kavkaza]
Pogorelov, A.V., *Zakavkazskiĭ regional'nyĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1990, Vol.87(94), p.133-140, In Russian. 8 refs.
Snow depth, Snow surveys, Snow cover structure, Analysis (mathematics).

46-984
Method for determining local spatial inhomogeneity in the snow cover on mountain slopes. [Metodika otsenki lokal'noĭ prostranstvennoĭ neodnorodnosti snezhnogo pokrova na sklonakh gor]
Golubev, V.N., et al, *Zakavkazskiĭ regional'nyĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1990, Vol.87(94), p.146-150, In Russian.
Sesiashvili, L.D.
Snow cover, Snow stratigraphy, Snow temperature, Slopes, Snow depth, Analysis (mathematics).

46-985
Forecasting avalanches of freshly fallen snow in the Rokskiy Mountain Pass. [Prognoz lavin svezhevypavshego snega dlia Rokskogo perevala]
Simoniia, T.K., *Zakavkazskiĭ regional'nyĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1990, Vol.87(94), p.150-153, In Russian. 4 refs.
Avalanche forecasting, Analysis (mathematics), Avalanche mechanics, Snow cover effect, Air temperature.

46-986
Monthly runoff distribution related to basin geography.
Copp, H.D., *Water resources bulletin*, Apr. 1991, 27(2), p.177-188, 7 refs.
River basins, Snowmelt, Stream flow, Runoff forecasting, Altitude, Precipitation (meteorology), Hydrology.

46-987
Defect site nucleation of microbubbles as a source of dynamic light scattering at the growing ice-water interface.
Vesenka, J.P., et al, *Journal of crystal growth*, Jan. 1991, 108(1-2), p.19-24, 25 refs.
Yeh, Y.
Ice water interface, Ice crystal growth, Light scattering, Bubbles, Heterogeneous nucleation, Ice crystal optics, Defects, Orientation, Surface properties.

46-988
Radar detection of subglacial sulfides.
Hammond, W.R., et al, *Geophysics*, June 1991, 56(6), p.870-873, 12 refs.
Sprenke, K.F.
Glacier surveys, Remote sensing, Subglacial observations, Radar echoes, Minerals, Exploration, Bedrock, Ice solid interface, Geophysical surveys.

46-989
Remarks on the freezing of a binary solution.
Seban, R.A., *International communications in heat and mass transfer*, May-June 1991, 18(3), p.351-359, 1 ref.
Solutions, Salt water, Freezing points, Ice water interface, Heat flux, Analysis (mathematics), Temperature distribution.

46-990
Freezing and thawing tests of high-strength concretes.
Pigeon, M., et al, *Cement and concrete research*, Sep. 1991, 21(5), p.844-852, 8 refs.
Gagné, R., Aitcin, P.C., Banthia, N.
Concrete aggregates, Concrete durability, Freeze thaw tests, Frost resistance, Air entrainment, Standards.

46-991
Phenomenological investigation of concrete deterioration in a median barrier.
Sarkar, S.L., et al, *Cement and concrete research*, Sep. 1991, 21(5), p.917-927, 22 refs.
Aitcin, P.C.
Concrete structures, Concrete durability, Decomposition, Cold weather performance, Frost action, Frost resistance, Reinforced concrete, Roads, Microstructure.

46-992
Accuracy of field classification of rocks in engineering-geocryological surveys. [Dostovernost' polevogo klassifitsirovaniia porod pri inzhenerno-geokriologicheskikh s"emkakh]
Merkushenkova, R.I., Kompleksirovanie metodov izucheniia gornykh porod pri inzhenerno-geokriologicheskikh s"emkakh; sbornik nauchnykh trudov (Combined methods of studying rocks in engineering-geocryological surveys; collected scientific papers). Edited by P.V. Tsarev, Moscow, VSEGINGEO, 1990, p.61-68, In Russian. 2 refs.
Geocryology, Engineering geology, Geological surveys, Accuracy, Classifications, Rocks.

46-993
Using geophysical methods in solving the problem of mapping rocks in engineering-geocryological surveys. [Ispol'zovanie geofizicheskikh metodov v reshenii zadach kartirovaniia gornykh porod pri inzhenerno-geokriologicheskikh s"emkakh]
Chekrygina, S.N., Kompleksirovanie metodov izucheniia gornykh porod pri inzhenerno-geokriologicheskikh s"emkakh; sbornik nauchnykh trudov (Combined methods of studying rocks in engineering-geocryological surveys; collected scientific papers). Edited by P.V. Tsarev, Moscow, VSEGINGEO, 1990, p.79-93, In Russian. 4 refs.
Geological surveys, Geocryology, Engineering geology, Geophysical surveys.

46-994
Secondary freezing of blasted high temperature *perennially frozen rocks.* [O vtorichnoĭ smerzaemosti vzorvannykh vysokotemperaturnykh mnogoletnemerzlykh porod]
Gushchin, V.P., et al, Otkrytye gornye raboty; nauchnye soobshcheniia (Open-pit mining; scientific reports). Edited by L.D. Borisenko, et al., Moscow, Institut gornogo dela im. A.A. Skochinskogo, 1990, p.91-95, In Russian. 2 refs.
Zarubin, S.V., Shadrin, V.V.
Frozen rocks, Blasting, Freezing.

46-995
Improving the effectiveness of road construction under the conditions in Siberia; interuniversity collected scientific papers. [Povyshenie effektivnosti dorozhnogo stroitel'stva v usloviiakh Sibiri; mezhvuzovskiĭ sbornik nauchnykh trudov]
Afinogenov, O.P., ed, Kemerovo, Kuzbasskiĭ politekhnicheskiĭ institut, 1991, 150p., In Russian. For selected papers see 46-996 through 46-1003.
Roads, Pavements, Roadbeds, Cold weather construction, Frost heave, Hydrothermal processes, Cold weather operation, Mathematical models, Seasonal freeze thaw, Loads (forces).

46-996
Modeling the distribution of transport loads along the width of the traffic lane. [Modelirovanie raspredeleniia transportnykh nagruzok po shirine proezzheĭ chasti]
Zyrianov, V.V., Povyshenie effektivnosti dorozhnogo stroitel'stva v usloviiakh Sibiri; mezhvuzovskiĭ sbornik nauchnykh trudov (Improving the effectiveness of road construction under the conditions in Siberia; interuniversity collected scientific papers). Edited by O.P. Afinogenov, Kemerovo, Kuzbasskiĭ politekhnicheskiĭ institut, 1991, p.18-23, In Russian. 3 refs.
Loads (forces), Roads, Mathematical models.

46-997
Calculating the hydrothermal regime of the roadbed and road pavement of highways in industrial regions of Siberia. [Osobennosti rascheta vodno-teplovogo rezhima zemlianogo polotna i dorozhnykh odezhd avtomobil'nykh dorog v promyshlennykh raionakh Sibiri].
Shelopaev, E.I., Povyshenie effektivnosti dorozhnogo stroitel'stva v usloviiakh Sibiri; mezhvuzovskiĭ sbornik nauchnykh trudov (Improving the effectiveness of road construction under the conditions in Siberia; interuniversity collected scientific papers). Edited by O.P. Afinogenov, Kemerovo, Kuzbasskiĭ politekhnicheskiĭ institut, 1991, p.32-37. In Russian. 4 refs.
Hydrothermal processes, Roads, Roadbeds, Pavements, Analysis (mathematics).

46-998
Formulating the problem of modeling the mechanical processes in soils in the "roads with a culvert" system based on the finite element method. [Postanovka zadachi dlia modelirovanie mekhanicheskikh protsessov v gruntakh sistemy "doroga s vodopropusknoĭ truboĭ" na osnove MKE].
Skomorokhova, O.M., et al, Povyshenie effektivnosti dorozhnogo stroitel'stva v usloviiakh Sibiri; mezhvuzovskiĭ sbornik nauchnykh trudov (Improving the effectiveness of road construction under the conditions in Siberia; interuniversity collected scientific papers). Edited by O.P. Afinogenov, Kemerovo, Kuzbasskiĭ politekhnicheskiĭ institut, 1991, p.37-41, In Russian. 6 refs.
Glazkov, IU.F.
Soil mechanics, Culverts, Roads, Frost heave, Cryogenic soils, Mathematical models.

46-999
Calculating the thermal-moisture regime of the bearing ground of highways. [Raschet temperaturno-vlazhnostnogo rezhima grunta osnovaniia avtomobil'noĭ dorogi].
Shuliat'ev, O.A., et al, Povyshenie effektivnosti dorozhnogo stroitel'stva v usloviiakh Sibiri; mezhvuzovskiĭ sbornik nauchnykh trudov (Improving the effectiveness of road construction under the conditions in Siberia; interuniversity collected scientific papers). Edited by O.P. Afinogenov, Kemerovo, Kuzbasskiĭ politekhnicheskiĭ institut, 1991, p.42-45, In Russian. 8 refs.
Petrov, A.N., Petrova, S.F.
Hydrothermal processes, Thermal regime, Soil water, Moisture transfer, Mathematical models, Frozen ground physics.

46-1000
Characteristics of the hydrothermal regime of the roadbed and taking them into account when designing non-rigid type road pavements in the first road-climatic zone. [Osobennosti vodno-teplovogo rezhima zemlianogo polotna i ikh uchet pri raschete dorozhnykh odezhd nezhestokogo tipa v I dorozhno-klimaticheskoĭ zone].
Davydov, V.A., Povyshenie effektivnosti dorozhnogo stroitel'stva v usloviiakh Sibiri; mezhvuzovskiĭ sbornik nauchnykh trudov (Improving the effectiveness of road construction under the conditions in Siberia; interuniversity collected scientific papers). Edited by O.P. Afinogenov, Kemerovo, Kuzbasskiĭ politekhnicheskiĭ institut, 1991, p.46-55, In Russian. 10 refs.
Roadbeds, Hydrothermal processes, Pavements, Frozen ground strength, Roads, Design criteria, Permafrost beneath roads, Deformation, Analysis (mathematics).

46-1001
Estimating the condition and strength of non-rigid road pavements under the conditions in Transbaykal. [Otsenka sostoianiia i prochnosti nezhestkikh dorozhnykh odezhd v usloviiakh Zabaĭkaliia].
Ushakov, V.V., Povyshenie effektivnosti dorozhnogo stroitel'stva v usloviiakh Sibiri; mezhvuzovskiĭ sbornik nauchnykh trudov (Improving the effectiveness of road construction under the conditions in Siberia; interuniversity collected scientific papers). Edited by O.P. Afinogenov, Kemerovo, Kuzbasskiĭ politekhnicheskiĭ institut, 1991, p.76-78, In Russian. 3 refs.
Roads, Pavements, Bearing strength, Cold weather performance.

46-1002
Improving the effectiveness of traffic lane markings on roads under the conditions in Siberia. [Povyshenie effektivnosti razmetki proezzhei chasti dorog v usloviiakh Sibiri].
Krasil'nikov, A.I., Povyshenie effektivnosti dorozhnogo stroitel'stva v usloviiakh Sibiri; mezhvuzovskiĭ sbornik nauchnykh trudov (Improving the effectiveness of road construction under the conditions in Siberia; interuniversity collected scientific papers). Edited by O.P. Afinogenov, Kemerovo, Kuzbasskiĭ politekhnicheskiĭ institut, 1991, p.85-90. In Russian.
Roads, Road maintenance, Cold weather operation, Plastics.

46-1003
Characteristics of the construction and operation of highways under the conditions of the Tomsk region. [Osobennosti stroitel'stva i ekspluatatsii avtomobil'nykh dorog v usloviiakh Tomskoĭ oblasti].
Efimenko, V.N., et al, Povyshenie effektivnosti dorozhnogo stroitel'stva v usloviiakh Sibiri; mezhvuzovskiĭ sbornik nauchnykh trudov (Improving the effectiveness of road construction under the conditions in Siberia; interuniversity collected scientific papers). Edited by O.P. Afinogenov, Kemerovo, Kuzbasskiĭ politekhnicheskiĭ institut, 1991, p.108-112, In Russian. 6 refs.
Chernykh, G.F.
Roads, Cold weather construction, Cold weather operation, Frost heave, Seasonal freeze thaw.

46-1004
Applications of cosmogenic Be-10 to problems in the earth sciences.
Morris, J.D., Annual review of earth and planetary sciences, Vol.19, Palo Alto, CA, Annual Reviews Inc., 1991, p.313-350, Refs. p.345-350.
Ice cores, Radioactive isotopes, Isotope analysis, Paleoclimatology, Solar activity, Radioactive age determination, Geochronology, Ice dating, Geomagnetism.
Accelerator mass spectrometry (AMS) is used to measure Be-10 *in ice cores*. Be-10, with a half-life of 1.5 million years, is produced by nuclear spallation reactions of cosmic rays with O and N in the atmosphere. The higher the cosmic ray intensity, the higher the Be-10 concentration, therefore concentrations of Be-10 in ice cores provide a record of past variations in cosmic ray intensity. A high Be-10 concentration may indicate an increase in solar activity or a decrease in the Earth's cosmic ray-shielding magnetic field. Comparisons of Be-10 with O-18, CO2, and CH4 in the Vostok ice core from Antarctica and other ice cores from Greenland suggest that temperatures were 8 C lower and precipitation 2 to 3 times less during the last glacial maximum than in the Holocene.

46-1005
Fate and erosion history of abandoned artificial islands in the Beaufort Sea.
Gilbert, G.R., et al, Canada. Geological Survey. Open file No.2334, Halifax, Nova Scotia, Canadian Seabed Research Ltd, 1990, 68p. + maps, 56 refs.
Addison, R., Hill, P.R.
Artificial islands, Shore erosion, Sediment transport, Ice scoring, Ocean environments, Environmental impact, Bottom topography, Ocean waves, Ocean currents.

46-1006
Emerald Lake watershed study: introduction and site description.
Tonnessen, K.A., *Water resources research*, July 1991, 27(7), p.1537-1539, 22 refs.
Snowmelt, Water chemistry, Watersheds, Snow impurities, Water pollution, Glacial lakes, United States—California—Sierra Nevada.

46-1007
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Dozier, J., Michaelsen, J.
Snow accumulation, Snow cover distribution, Snow water equivalent, Watersheds, Snow surveys, Snow depth, Alpine landscapes, United States—California—Sierra Nevada.

46-1008
Hydrologic characteristics and water balance of an alpine basin in the Sierra Nevada.
Kattelmann, R.C., et al, *Water resources research*, July 1991, 27(7), p.1553-1562, 54 refs.
Elder, K.
Snowmelt, Snowfall, Water balance, Precipitation (meteorology), Alpine landscapes, Watersheds, Snow surveys, Snow evaporation, United States—California—Sierra Nevada.

46-1009
Precipitation chemistry in and ionic loading to an alpine basin, Sierra Nevada.
Williams, M.W., et al, *Water resources research*, July 1991, 27(7), p.1563-1574, 51 refs.
Melack, J.M.
Snowmelt, Water chemistry, Snow impurities, Water pollution, Precipitation (meteorology), Snowfall, Watersheds, United States—California—Sierra Nevada.

46-1010
Solute chemistry of snowmelt and runoff in an alpine basin, Sierra Nevada.
Williams, M.W., et al, *Water resources research*, July 1991, 27(7), p.1575-1588, 42 refs.
Melack, J.M.
Snowmelt, Water chemistry, Snow impurities, Runoff, Water pollution, Watersheds, United States—California—Sierra Nevada.

46-1011
Creep behavior of fine-grained frozen soils.
Wijeweera, H., et al, *Canadian geotechnical journal*, Aug. 1991, 28(4), p.489-502, With French summary, 16 refs.
Joshi, R.C.
Frozen ground strength, Frozen ground mechanics, Soil creep, Frozen ground compression, Frozen ground temperature, Water content, Mathematical models.

46-1012
Generalized finite-element algorithm for laterally loaded piles in permafrost in comparison with measurements.
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Ladanyi, B.
Frozen ground mechanics, Permafrost beneath structures, Pile load tests, Piles, Soil creep, Frozen ground strength, Mathematical models.

46-1013
New cement-based grout for sealing anchors in the frozen rock of the Far North. [Nouveau coulis à base de ciment pour le scellement d'ancrages dans le roc gelé du Grand Nord].
Benmokrane, B., et al, *Canadian geotechnical journal*, Aug. 1991, 28(4), p.574-583, In French with English summary. 23 refs.
Ballivy, G., Hernandez, P., Aïtcin, P.C.
Grouting, Anchors, Frozen rock strength, Permafrost beneath structures, Cements, Antifreezes.

46-1014
Nonlinear stress analysis of muskeg via finite element.
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Mohamed, A.M.O., Tali, R.G.
Muskeg, Soil strength, Compressive properties, Tensile properties, Soil trafficability, Peat, Mathematical models.

46-1015
Satellite remote sensing of mountain geomorphic surfaces.
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Alpine landscapes, Terrain identification, Slope stability, Avalanche forecasting, Remote sensing, Spaceborne photography, Mountains, Landslides, Mudflows.

46-1016
Evaluation of the potential of* RADARSAT *for flood mapping using simulated SAR imagery.
Leconte, R., et al, *Canadian journal of remote sensing*, July 1991, 17(3), p.241-249, With French summary, 15 refs.
Pultz, T.J.
Flood forecasting, Terrain identification, Runoff forecasting, Simulation, Ice surveys, Spaceborne photography, Synthetic aperture radar.

46-1017
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Godone, F., Mortara, G.
Avalanches, Icefalls, Basal sliding, Mountain glaciers, Italy—Alps.

46-1018
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Charlier, C.
Avalanche forecasting, Avalanche modeling, Avalanche engineering, Computer applications, Computer programs.

46-1019
Tardiglacial and Holocene evolution of glaciers and vegetation in the Alpe d'Huez area (Oisans, French Alps). (L'évolution tardiglaciaire et holocène des glaciers et de la végétation autour de l'Alpe d'Huez (Oisans, Alpes Françaises)).
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Alpine glaciation, Vegetation patterns, Alpine landscapes, Mountain glaciers, Glacier oscillation, Paleoclimatology, Human factors, Forest lines, France—Alps.

46-1020
Temperature measurements in geotechnical studies using low-noise, high-resolution digital techniques.
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Narod, B., Chandra, B., Bennest, J.R.
Hydrogeology, Subpermafrost ground water, Temperature measurement, Measuring instruments, Thermal regime, Geothermometry, Boreholes, Water flow, Probes.

46-1021
Thaw settlement and consolidation of clay silt from Kangiqsualujjuaq. (Tassement et consolidation au dégel d'un silt argileux à Kangiqsualujjuaq).
Leroueil, S., et al, *Canadian geotechnical journal*, Oct. 1991, 28(5), p.678-689, In French with English summary. 19 refs. For another version see 44-3676.
Dionne, G., Allard, M.
Clay soils, Soil tests, Thaw consolidation, Frozen ground settling, Permafrost bases, Permafrost physics, Foundations.

46-1022
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Clays, Freeze thaw cycles, Frost action, Shear strength, Frozen ground mechanics, Soil tests, Thaw consolidation, Mechanical properties.

46-1023
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Vaziri, H., et al, *Canadian geotechnical journal*, Oct. 1991, 28(5), p.708-718, With French summary. 19 refs.
Han, Y.C.
Concrete piles, Mechanical tests, Stability, Frozen ground mechanics, Vibration, Dislocations (materials), Foundations, Soil tests, Dynamic properties.

46-1024
Permafrost and thermal interfaces from Norman Wells pipeline ditchwall logs.
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Saunders, R., Smith, J.
Permafrost distribution, Discontinuous permafrost, Geophysical surveys, Soil temperature, Underground pipelines, Interfaces, Permafrost thermal properties, Cold weather construction, Statistical analysis.

46-1025
Role that fracture plays during ice failure.
Marcellus, R.W., et al, *Canadian geotechnical journal*, Oct. 1991, 28(5), p.752-759, With French summary. 26 refs.
Heuff, D.N.
Sea ice, Ice mechanics, Ice cover strength, Ice solid interface, Ice breaking, Cracking (fracturing), Loading, Brittleness, Ice microstructure.

46-1026
Freezing potentials arising on solidification of dilute aqueous solutions of electrolytes.
Bronshtein, V.L., et al, *Journal of crystal growth*, May 1991, 112(1), p.129-145, 23 refs.
Chernov, A.A.
Solutions, Ice crystal growth, Solidification, Ice water interface, Freezing potential (electrical), Ion diffusion, Chemical analysis, Charge transfer, Analysis (mathematics).

46-1027
Convolution operator techniques and asymptotic expansions for long-term behaviour of laterally loaded piles in permafrost.
Foriero, A., et al, *International journal for numerical and analytical methods in geomechanics*, June 1991, 15(6), p.443-452, 9 refs.
Ladanyi, B.
Piles, Loading, Dislocations (materials), Soil creep, Frozen ground mechanics, Permafrost beneath structures, Forecasting, Analysis (mathematics).

46-1028
Denitrification and ammonification at low soil temperatures.
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Beauchamp, E.G.
Organic soils, Soil freezing, Soil temperature, Soil chemistry, Frozen ground chemistry, Temperature effects, Soil tests, Substrates, Chemical properties.

46-1029
Temperature and pressure-induced phase transitions in ice.
Bizid, A., et al, *Phase transitions B*, 1991, 31(1-4), p.187-196, 35 refs.
Bosio, L., Defrain, A., Oumezzine, M.
Water structure, Molecular structure, Ice structure, Phase transformations, Solid phases, Temperature effects, Hydrogen bonds, High pressure ice, Amorphous ice.

46-1030
Observations of deformations in ice fields.
Smirnov, V.N., et al, *Akademiia nauk SSSR. Izvestiia. Physics of the solid earth*, July 1989, 24(12), p.997-1000, Translated from Izvestiia. Fizika Zemli. 4 refs.
Shishlebin, A.I.
Sea ice, Ice cover strength, Ice deformation, Strain tests, Relaxation (mechanics), Periodic variations.

46-1031
Photoadaptation, growth and production of bottom ice algae in the antarctic.
Cota, G.F., et al, *Journal of phycology*, 1990, 26(3), p.399-411, Refs. p.410-411.
Sullivan, C.W.
Algae, Nutrient cycle, Photosynthesis, Sea ice, Ice cover effect, Antarctica—McMurdo Sound.
Biomass, chemical composition, growth rates and the photosynthetic response of natural populations of sea ice algae in McMurdo Sound were followed over most of the spring bloom to examine temporal variability under a relatively constant incident irradiance. Collections were restricted to the bottom 20 cm of the ice sheet in an area with little or no snow (0-5 cm). At low temperature and irradiance these algae normally exhibited low assimilation numbers. Average growth rates, based on changes in standing stocks, were also low. Biomass, biochemical composition, growth rates, assimilation numbers and photosynthetic efficiencies displayed large fluctuations over periods of several days during the growth season. On the other hand, photoadaptation, and photosynthesis were relatively constant with less than twofold variation throughout the study. Substantial nutrient fluxes were necessary to satisfy the minimum nutrient demand for the observed biomass levels and population growth rates. Only 5-25% of the total demand could be met by all of the nutrients in the ice sheet, if they were readily available. However, adequate amounts were present in the top few met f the water column. (Auth. mod.)

46-1032
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Morison, J., *Journal of geophysical research*, Oct. 15, 1991, 96(C10), p.18,381-18,395, 33 refs.
Ocean currents, Velocity measurement, Seasonal variations, Water pressure, Atmospheric pressure, Heat flux, Wind factors, Oceanography, Water temperature, Greenland Sea—Fram Strait.

46-1033
Response of sea ice drift to wind forcing on the northeastern Newfoundland Shelf.
Fissel, D.B., et al, *Journal of geophysical research*, Oct. 15, 1991, 96(C10), p.18,397-18,409, 29 refs.
Tang, C.L.
Sea ice distribution, Drift, Wind factors, Ocean currents, Velocity measurement, Periodic variations, Air ice water interactions, Wind direction.

46-1034
Sea ice ridging in the eastern Weddell Sea.
Lytle, V.I., et al, *Journal of geophysical research*, Oct. 15, 1991, 96(C10), MP 2973, p.18,411-18,416, 17 refs.
Ackley, S.F.
Sea ice, Ice cover thickness, Pressure ridges, Height finding, Acoustic measurement, Oceanographic surveys, Ice deformation, Sounding, Statistical analysis, Antarctica—Weddell Sea.
Sea ice ridge heights and spatial frequency in the eastern Weddell Sea were measured in 1986 using a ship-based acoustical sounder. Using a minimum ridge sail height of 0.75 m, a total of 933 ridges were measured along a track length of 415 km. The ridge frequency varied from 0.4 to 10.5 ridges/km. The mean height of the ridges was found to be about 1.1 m regardless of the ridge frequency. These results are compared to other ridging statistics from the Ross Sea and found to be similar. Comparison with arctic data, however, indicates that the height and frequency of the ridges are considerably less in the Weddell Sea than in the Arctic. Whereas in the Arctic the mean ridge height tends to increase with the ridge frequency, this was not the case in the Weddell Sea, where the mean ridge height remained constant irrespective of the ridge frequency. Estimates of the contribution of deformed ice to the total ice thickness are generally low, except for a single 5.3 km section where the ridge frequency increased by an order of magnitude. This resulted in an increase in the equivalent mean ice thickness due to ridging from 0.04 m in the less deformed areas to 0.45 m in the highly deformed section. These values were found to be consistent with values obtained from drilled profile lines during the same cruise. (Auth. mod.)

46-1035
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Key, J., et al, *Journal of geophysical research*, Oct. 15, 1991, 96(C10), p.18,417-18,423, 12 refs.
Peckham, S.
Sea ice distribution, Polynyas, Ice cover thickness, Acoustic measurement, Accuracy, Subglacial observations, Analysis (mathematics), Ice surface.

46-1036
Guidance document for selecting antiskid materials applied to ice- and snow-covered roadways. *U.S. Environmental Protection Agency. Office of Air Quality Planning and Standards. Report*, July 1991, EPA-450/3-90-007-A, Var. p., PB91-222042, Refs. p.8/1-8/6 and B2-B6.
Road icing, Road maintenance, Skid resistance, Chemical ice prevention, Air pollution, Environmental protection, Salting, Sanding.

46-1037
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Kendrick, A.
Icebreakers, Ice navigation, Ice breaking, Ice models, Test chambers, Ice solid interface.

46-1038
Ice Penetration System makes access holes in ice for divers and equipment.
U.S. Naval Civil Engineering Laboratory, Port Hueneme, CA, *NCEL techdata sheet*, Aug. 1991, No.91-02, 3p.
Ice cutting, Ice drills, Artificial melting.

46-1039
Landsat captures view of northern Ellesmere Island.
Fitzgerald, D., *Alaska. University. Geophysical Institute. Quarterly*, Fall 1990, 9(1), p.5-6.
Glacier surveys, Ice surveys, Sea ice distribution, Ice shelves, LANDSAT, Spaceborne photography, Canada—Northwest Territories—Ellesmere Island.

46-1040
Method of ranking the grip of industrial footwear on water wet, oily and icy surfaces.
Manning, D.P., et al, *Safety science*, 1991, Vol.14, p.1-12, 6 refs.
Jones, C., Bruce, M.
Clothing, Rubber ice friction, Traction, Safety, Human factors engineering.

46-1041
Rapid fluctuations of the Laurentide Ice Sheet at the mouth of Hudson Strait: new evidence for ocean/ice-sheet interactions as a control on the Younger Dryas.
Miller, G.H., et al, *Paleoceanography*, Dec. 1990, 5(6), p.907-919, 43 refs.
Kaufman, D.S.
Ice sheets, Glacier oscillation, Air ice water interaction, Paleoclimatology, Glaciation, Geochronology, Glacial geology, Sea ice, Pleistocene, Canada—Northwest Territories—Hudson Strait.

46-1042
Glacigenic sediments.
Brodzikowski, K., et al, Developments in sedimentology, Vol.49, Amsterdam, Elsevier Science Publishers, 1991, 674p., Refs. p.561-667.
Van Loon, A.J.
Glacial deposits, Glacial erosion, Glacial geology, Glaciation, Periglacial processes, Quaternary deposits, Sediment transport, Mass movements (geology), Sedimentation, Ice rafting.

46-1043
Arctic camp support equipment.
U.S. Naval Civil Engineering Laboratory, Port Hueneme, CA, *NCEL techdata sheet*, Sep. 1991, No.91-03, 4p.
Portable shelters, Cold weather survival, Logistics, Cold weather operation.

46-1044
Heat pump chilled foundations for buildings on permafrost.
Baker, T.H.W., et al, *Geotechnical news*, Sep. 1990, 5p.
Goodrich, L.E.
Permafrost beneath structures, Foundations, Permafrost preservation.

46-1045
Polynyas; quirks of nature in the Arctic.
Struzik, E., *Above and beyond*, Fall 1991, 3(4), p.6-13.
Polynyas, Ecosystems, Ocean environments.

46-1046
***Investigation of former* subglacial (Nye) channels on a proglacial bedrock area at Gornergletscher, Kanton Wallis, Switzerland.**
Godbold, N., Manchester, England, University, School of Geography, 1990, 172p., B.Sc. honors paper, 45 refs.
Subglacial drainage, Glacier beds, Glacial erosion, Bedrock, Basal sliding, Periglacial processes, Meltwater, Water erosion, Switzerland—Gornergletscher.

46-1047
Investigations of freshwater and ice surveying using short-pulse radar.
O'Neill, K., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, July 1991, CR 91-15, 22p., ADA-241 435, 18 refs.
Arcone, S.A.
Ice surveys, Ice cover thickness, Radar echoes, Aerial surveys, Lake ice, River ice, Ice water interface, Analysis (mathematics).
An overview is presented of recent activities and results in the use of commercially available short-pulse UHF radar for surveying ice conditions on freshwater bodies. Improvements in radar systems have made it possible to increase ice thickness resolution by as much as one third relative to that in past attempts, and some new signal processing approaches shown here may offer an order of magnitude improvement. Results from airborne surveying are shown. An algorithm is presented that locates returns from interfaces in the presence of noise for a non-minimum delay wavelet. The method performs a simple inversion in the frequency domain, enhanced by a time dependent weight designed to recognize the shape of the wavelet amplitude and phase spectra. Thin ice layers are resolved down to a few centimeters and are distinguished from an ice-free condition by means of a matched filter system designed to recognize the interference pattern from parallel interfaces close to one another.

46-1048
Groundwater-discharge wetlands in the Tanana Flats, interior Alaska.
Racine, C.H., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, July 1991, CR 91-14, 10p., ADA-241 282, 28 refs.
Walters, J.C.
Wetlands, Ground water, Swamps, Vegetation patterns, Permafrost hydrology, River basins, Drainage, Thermokarst, United States—Alaska—Tanana River.
In the northwest corner of the Tanana Flats, a lowland basin just south of Fairbanks, there is a vast network of floating-mat wetlands or fens that appear to be unique in terms of their origin, large areal extent, and absence of *Sphagnum* moss and associated peat. These wetlands consist of a floating vegetation mat up to 1 m thick, forming an almost complete cover over deeper water bodies. The mats consist of a tall, dense and productive network of emergent vascular plants. Evidence that these wetlands are formed by groundwater discharge includes a) the apparent absence of permafrost under these wetlands but its presence on the adjacent forested uplands, b) nearby winter icings resulting from artesian springs, c) the relatively high pH, conductivity, calcium and magnesium concentrations of the water, d) the vascular plant species composition and in particular the absence of *Sphagnum* moss, and e) the flow of water and the geological history of the area. Expansion of these fens in several places is suggested by dead and dying white birch along the along-fen margin, where permafrost thaw and subsidence (thermokarst) is taking place.

46-1049
Management of vegetation on ammunition magazines at AMC facilities.
Palazzo, A.J., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, June 1991, SR 91-09, 24p, ADA-241 309.
Racine, C.H., Woodson, W., Pidgeon, D.E., Cate, D.W.
Military facilities, Vegetation, Earthwork, Storage.
The purpose of this study is to report the results of a survey of Army Materiel Command (AMC) facilities to assist in developing strategies for managing vegetation on ammunition bunkers or igloos. The survey questions addressed the number of igloos managed, the climate, the soils, and the types of vegetation managed. A total of 36 facilities located in 28 states were surveyed. These facilities manage 18,624 bunkers. The vegetation dominating the bunker surfaces varies according to the climate and location of the facilities. Soil types also vary widely. All respondents said that igloos provide important wildlife habitat. Vegetation management practices varied; mowing and herbicide use are common, and annual management expenses are mostly less than $300 per igloo.

46-1050
Spatial reasoning in knowledge-based systems; application to analysis of avalanche sites. [Le raisonnement spatial dans les systèmes à base de connaissances; application à l'analyse de sites avalancheux],
Buisson, L., Grenoble, Université Joseph Fourier, 1990, 176p., In French with English summary. Ph.D. thesis. Refs. p.161-171.
Avalanche modeling, Avalanche forecasting, Avalanche tracks, Computer applications, Computer programs, Data processing.

46-1051
Durability of concrete.
International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991, ACI SP-126, Detroit, American Concrete Institute, 1991, 1361p. (2 vols.), Refs. passim. For selected papers see 46-1052 through 46-1069.
Malhotra, V.M., ed.
Concrete durability, Frost resistance, Concrete freezing, Freeze thaw cycles, Concrete admixtures, Chemical ice prevention, Air entrainment, Marine atmospheres.

46-1052
Durability of concrete-fifty years of progress?.
Mehta, P.K., International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.1-31, 61 refs.
Concrete durability, Concrete freezing, Frost resistance, Freeze thaw cycles.

46-1053
Durability of offshore and marine concrete structures.
Hoff, G.C., International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.33-64, 26 refs.
Concrete durability, Offshore structures, Frost resistance, Concrete structures, Freeze thaw cycles, Concrete freezing, Marine atmospheres.

46-1054
Some aspects of durability of high-volume ASTM Class F (low-calcium) fly ash concrete.
Malhotra, V.M., et al, International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.65-82, 16 refs.
Concrete durability, Frost resistance, Freeze thaw cycles, Concrete admixtures.

46-1055
Freezing and thawing durability of high-strength lightweight concretes.
Whiting, D., et al, International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.83-100, 12 refs.
Burg, R.
Concrete durability, Frost resistance, Concrete freezing, Lightweight concretes, Concrete strength, Freeze thaw tests.

46-1056
Freezing and thawing durability of roller-compacted concrete.
Dolen, T.P., International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.101-113, 5 refs.
Concrete durability, Concrete freezing, Frost resistance, Air entrainment, Freeze thaw tests.

46-1057
Use of air entrainment to ensure the frost resistance of roller-compacted concrete pavements.
Ragan, S.A., International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.115-130, 5 refs.
Concrete pavements, Air entrainment, Frost resistance, Concrete durability, Concrete freezing, Frost protection, Freeze thaw cycles.

46-1058
Performance of roller-compacted concrete—Corps of Engineers' experience.
Liu, T.C., International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.155-167, 8 refs.
Concrete durability, Frost resistance, Freeze thaw cycles, Cold weather performance, Concrete placing, Compaction, Freeze thaw cycles.

46-1059
Freezing and thawing resistance of anti-washout concrete under water.
Yamato, T., et al, International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.169-183, 6 refs.
Emoto, Y., Soeda, M.
Concrete durability, Concrete freezing, Frost resistance, Freeze thaw cycles.

46-1060
Deicer salt scaling resistance of high strength concretes made with different cements.
Gagne, R., et al, International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.185-199, 11 refs.
Pigeon, M., Aitcin, P.C.
Concrete durability, Frost resistance, Concrete strength, Chemical ice prevention, Freeze thaw cycles.

46-1061
Influence of curing and drying on salt scaling resistance of fly ash concrete.
Bilodeau, A., et al, International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.201-228, 10 refs.
Carette, G.G., Malhotra, V.M., Langley, W.S.
Concrete durability, Frost resistance, Chemical ice prevention, Concrete curing, Concrete admixtures, Freeze thaw cycles.

46-1062
Effect of composition and aging on the frost resistance of high-strength concrete.
Kukko, H., et al, International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.229-248, 12 refs.
Matala, S.
Concrete durability, Frost resistance, Concrete freezing, Concrete strength, Freeze thaw cycles, Concrete admixtures.

46-1063
Freezing and thawing resistance of non air-entrained and air-entrained concretes containing a high percentage of condensed silica fume.
Galeota, D., et al, International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.249-261, 7 refs.
Giammatteo, M.M., Marino, R., Volta, V.
Concrete durability, Concrete freezing, Frost resistance, Freeze thaw tests, Concrete admixtures, Air entrainment.

46-1064
Acoustic emissions of mortar subjected to freezing and thawing.
Shimada, H., et al, International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.263-278.
Sakai, K., Litvan, G.G.
Concrete durability, Frost resistance, Concrete freezing, Mortars, Freeze thaw tests, Acoustic measurement.

46-1065
Durability properties of overlays for erosion-damaged concrete.
Mirza, J., International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.279-294, 6 refs.
Concrete durability, Frost resistance, Hydraulic structures, Erosion, Thermal expension, Freeze thaw tests.

46-1066
Durability of concrete to marine environment.
Beslac, J., International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.1. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.599-608, 7 refs.
Concrete durability, Frost resistance, Freeze thaw cycles, Marine atmospheres, Bridges.

46-1067
Freeze thaw durability of steel and polypropylene reinforced shotcretes: a review.
Morgan, D.R., International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.2. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.901-918, 15 refs.
Concrete durability, Frost resistance, Concrete freezing, Reinforced concretes, Freeze thaw tests, Composite materials.

46-1068
Durability of structural lightweight concrete.
Holm, T.A., et al, International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.2. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.1119-1133, 26 refs.
Bremner, T.W.
Concrete durability, Frost resistance, Freeze thaw tests, Lightweight concretes, Marine atmospheres.

46-1069
Durability of cements with fillers.
Ranc, R., et al, International Conference on Durability of Concrete, 2nd, Montreal, Aug. 4-9, 1991. ACI SP-126. Vol.2. Edited by V.M. Malhotra, Detroit, American Concrete Institute, 1991, p.1239-1257, 7 refs.
Moranville-Regourd, M., Cochet, G., Chaudouard, G.
Concrete durability, Frost resistance, Cements, Freeze thaw tests.

46-1070
Phyto- and protozooplankton biomass during austral summer in surface waters of the Weddell Sea and vicinity.
Nöthig, E.M., et al, *Polar biology*, Sep. 1991, 11(5), p.293-304, Refs. p.303-304.
Von Bodungen, B., Sui, Q.B.
Algae, Sea water, Biomass, Antarctica—Weddell Sea, Antarctica—Bransfield Strait.
Phyto- and protozooplankton were sampled in the upper 10 m of the water column from Jan. 6 to Feb. 20, 1985 in the eastern Bransfield Strait vicinity and in the Weddell Sea. The plankton assemblages are discussed in relation to physical, chemical and biological factors in the different geographical areas in summer. Phytoplankton biomass (Phytoplankton carbon, PPC) ranged from 4-194 micrograms carbon l and consisted on average of 65% diatoms and 35% autotrophic flagellates. In general, autotrophic flagellates and small pennate diatoms dominated at oceanic stations; in neritic areas large centric diatoms prevailed. Chlorophyll *a* concentrations ranged from 0.25-3.14 micrograms chl *a*/l. Protozooplankton biomass (Protozooplankton carbon, PZC) ranged from 0-67 micrograms carbon l and consisted of 49% ciliates, 49% heterotrophic dinoflagellates and 2% tintinnids. Protozooplankton amounted to 25% on an average of the combined biomass of PPC plus PZC for the entire investigation period. Protozoan biomass in the southeastern and southern Weddell Sea occasionally exceeded phytoplankton biomass. Temperature, salinity and inorganic nutrients were generally lower in the southern regions; at most of these stations a meltwater layer occurred in the upper meters of the water column. It is suggested that this physical regime allows a well-developed summer system with a high proportion of heterotrophic microplankton. In the eastern Bransfield Strait, in the northern Weddell Sea and close to the coast off Vestkapp, however, early summer conditions occurred with less protozooplankton contribution. (Auth. mod.)

46-1071
Photosynthesis, dark respiration and light independent carbon fixation of endemic antarctic macroalgae.
Thomas, D.N., et al, *Polar biology*, Sep. 1991, 11(5), p.329-337, Refs. p.336-337.
Wiencke, C.
Algae, Low temperature research, Photosynthesis, Acclimatization, Antarctica—King George Island.
The light saturated photosynthesis, dark respiration and light independent carbon fixation of macroalgal species endemic to the Antarctic were measured. Five brown algae, *Ascoseira mirabilis, Desmarestia anceps, D. antarctica, Phaeurus antarcticus, Himantothallus grandifolius* and the red alga *Palmaria decipiens* were included. Rates of these three parameters at 0 C were very similar to those measured in other studies on temperate algae at higher temperature. This indicates a high degree of physiological adaptation to the antarctic environment within these species. A comparison was made of polarographic and chemical means of measuring oxygen flux during photosynthesis and dark respiration at low temperature. There was a good correlation between measurements of oxygen evolution and carbon fixation, although apparent photosynthetic quotient values were in most cases high. (Auth.)

46-1072
Primary production by benthic microalgae in nearshore marine sediments of Signy Island, Antarctica.
Gilbert, N.S., *Polar biology*, Sep. 1991, 11(5), p.339-346, Refs. p.345-346.
Sea ice, Algae, Biomass, Antarctica—Signy Island.
During the summer of 1987-1988, three 24 h in situ primary productivity measurements were made at a nearshore sublittoral site on the east coast of Signy I. The first experiment in Dec. coincided with the peak of the benthic algal bloom, as shown by benthic chlorophyll measurements and a primary productivity rate of 700.9 mg carbon/sq m/d. In Jan., the experiment was undertaken during the peak of the phytoplankton bloom when light intensities reaching the benthos were greatly reduced; the productivity rate was reduced by half. In Mar. the phytoplankton bloom had died off, benthic light intensities had increased and production increased also. The experiments indicate changes in benthic microalgal activity during the summer, linked to changes in the benthic light climate. Compared with previous measurements of phytoplankton activity at Signy, the microphytobenthos seems to be an important source of primary production. (Auth. mod.)

46-1073
Is the strength of sea ice related to its chlorophyll content.
Eicken, H., et al, *Polar biology*, Sep. 1991, 11(5), MP 2974, p.347-350, 18 refs.
Ackley, S.F., Richter-Menge, J.A., Lange, M.A.
Ice composition, Ice cover strength, Ice density, Sea ice, Algae, Seasonal ablation, Antarctica—Weddell Sea.
Results of uniaxial compression tests are compared to porosity and chlorophyll content of granular sea-ice samples, collected in the Weddell Sea from June to Nov. of 1986. Compressive failure stresses are significantly correlated with the total porosity of the ice, but exhibit no correlation with chlorophyll concentration. It is suggested that high chlorophyll concentrations may accompany low ice strengths only because high porosities, which are responsible for low mechanical strength, can be linked to sea-ice biology. High concentrations of ice algae may be either cause or effect of high porosities (through absorption of solar radiation in the first case or due to enhanced nutrient supply and environmental space in the second case). As a cause of high porosities, ice organisms could therefore indirectly influence the spring breakup of floes and thus the course of the ablation season. (Auth.)

46-1074
Synthesis of the Arctic Ocean circulation.
Aagaard, K., *Rapports et procès-verbaux des réunions du Conseil international pour l'Exploration de la Mer*, 1989, Vol.188, p.11-22, 30 refs.
Ocean currents, Water transport, Oceanographic surveys, Drift.

46-1075
Statistical mechanical theories of freezing: where do we stand.
Baus, M., et al, *Physica A*, 1991, Vol.176, p.28-36, 13 refs.
Lutsko, J.F.
Phase transformations, Thermodynamics, Statistical analysis, Density (mass/volume).

46-1076
Self-organization manifest as patterned ground in recurrently frozen soils.
Krantz, W.B., *Earth-science reviews*, 1990, Vol.29, p.117-130, 20 refs.
Patterned ground, Soil freezing, Frozen ground thermodynamics, Ground thawing, Freeze thaw cycles.

46-1077
In-situ acoustical investigations of deep snow.
Moore, H.M., et al, *Applied acoustics*, 1991, Vol.33, p.281-301, 30 refs.
Attenborough, K., Rogers, J.C., Lee, S.M.
Snow acoustics, Snow surveys, Snow density, Snow hardness, Acoustic measurement.

46-1078
Mineral resources of western arctic Alaska.
Mowatt, T.C., et al, *U.S. Bureau of Land Management. BLM-Alaska open file report*, Nov. 1991, No.39, 27p., 35 refs.
Dygas, J.A., Gibson, C., Seidlitz, A.L.
Exploration, Minerals, Natural resources, Geochemistry, Economic development, United States—Alaska.

46-1079
Red Dog deposit, northwestern Alaska: discovery, delineation and development implications.
Mowatt, T.C., et al, *U.S. Bureau of Land Management. BLM-Alaska open file report*, Nov. 1991, No.38, 15p., 9 refs.
Dygas, J.A., Gibson, C.
Exploration, Minerals, Natural resources, Economic development, United States—Alaska.

46-1080
Platinum and palladium in mafic-ultramafic igneous rocks, northwestern Alaska.
Mowatt, T.C., *U.S. Bureau of Land Management. BLM-Alaska open file report*, Nov. 1991, No.37, 21p., 6 refs.
Exploration, Minerals, Natural resources, Geochemistry, United States—Alaska.

46-1081
Construction in cold regions; a guide for planners, engineers, contractors, and managers.
McFadden, T.T., et al, New York, John Wiley and Sons, 1991, 615p., Refs. p.537-556.
Bennett, F.L.
Cold weather construction, Permafrost beneath structures, Permafrost beneath roads, Cold weather operation, Pipelines, Ice strength, Ice (construction material), Foundations.

46-1082
Surface effects of small spheres on their migration ahead of an ice front. [Etat de surface de billes de petits diamètres et leur migration à l'aval d'un front de glace].
Brierre, A., et al, *Annales de chimie*, 1991, 16(3), p.243-251, In French with English summary. 9 refs.
Yemmou, M., Azouni, M.A.
Ice water interface, Solidification, Freezing front, Spheres, Surface energy, Nucleation, Synthetic materials, Bubbles.

46-1083
***Development of miniature sorted patterned ground* following soil erosion in East Falkland, South Atlantic.**
Wilson, P., et al, *Earth surface processes and landforms*, June 1991, 16(4), p.369-376, 29 refs.
Clark, R.
Patterned ground, Sorting, Periglacial processes, Soil formation, Soil erosion, Frost action, Climatic factors, Cryogenic processes, Soil patterns, Falkland Islands—East Falkland.

46-1084
Model of transitional processes in a tundra-taiga system.
Bogatyrev, B.G., *Akademiia nauk SSSR. Doklady. Biological sciences*, July 1991, 316(1-6), p.7-10, 3 refs.
For Russian original see 45-2636.
Tundra, Taiga, Revegetation, Global warming, Temperature effects, Plant ecology, Ecosystems, Mathematical models, Climatic factors.

46-1085
Aircraft ground deicing—a flight crew perspective.
Haase, D.J., *Society of Automotive Engineers. Technical paper*, 1990, 901994, 8p., Paper presented at the Aerospace Technology Conference and Exposition, Long Beach, CA, Oct. 1-4, 1990. 6 refs.
Aircraft icing, Accidents, Safety, Ice removal, Ice prevention, Standards, Education.

46-1086
Utilization of surface cover composition to improve the microwave determination of snow water equivalent in a mountain basin.
Chang, A.T.C., et al, *International journal of remote sensing*, Nov. 1991, 12(11), p.2311-2319, 12 refs.
Foster, J.L., Rango, A.
River basins, Snow water equivalent, Snow cover distribution, Remote sensing, Radiometry, Topographic effects, Microwaves, Runoff forecasting, Mountains.

46-1087
Method for masking microwave radiometer data polluted by the presence of land and ice.
Ozieblo, A., et al. *International journal of remote sensing*, Nov. 1991, 12(11), p.2379-2388, 4 refs.
Etcheto, J.
Remote sensing, Sea ice distribution, Ice cover effect, Radiometry, Wind velocity, Data processing, Geophysical surveys, Microwaves, Accuracy.

46-1088
What you need to know about deicers. *Better roads*, Jan. 1991, 61(1), p.26-27.
Road icing, Ice removal, Chemical ice prevention, Cost analysis, Salting.

46-1089
Automated tracking of ice floes: a stochastic approach.
Banfield, J., *IEEE transactions on geoscience and remote sensing*, Nov. 1991, 29(6), p.905-911, 10 refs.
Sea ice distribution, Ice floes, Radar tracking, Drift, Synthetic aperture radar, Spaceborne photography, Image processing, Ice edge, Analysis (mathematics).

46-1090
(Psi)-S correlation and dynamic time warping: two methods for tracking ice floes in SAR images.
McConnell, R., et al. *IEEE transactions on geoscience and remote sensing*, Nov. 1991, 29(6), p.1004-1012, 12 refs.
Sea ice distribution, Ice floes, Radar tracking, Drift, Spaceborne photography, Synthetic aperture radar, Image processing, Resolution, Ice edge.

46-1091
Freeze-drying of thin plates by microwaves.
Sochanski, J., et al. *Journal of microwave power and electromagnetic energy*, 1991, 26(2), p.90-99, 7 refs.
Freeze drying, Sublimation, Microwaves, Solids, Plates, Mass transfer, Vapor pressure, Temperature distribution, Analysis (mathematics), Radiation absorption.

46-1092
Ensembles of hydrogen bonds in liquids, ice nuclei, and in computer modeling.
Efimov, IU.IA, *Journal of molecular structure*, Sep. 15, 1990, Vol.237, Workshop on Horizons in Hydrogen Bond Research, 9th, Zeist, Netherlands, Sep. 10-15, 1989. Proceedings. Edited by A.J. Barnes et al, p.93-103, 12 refs.
Hydrogen bonds, Molecular structure, Liquids, Ice nuclei, Molecular energy levels, Heterogeneous nucleation, Computerized simulation, Temperature effects, Spectra.

46-1093
Hydrogen-bond networks in supercooled liquid water and amorphous/vitreous ices.
Dore, J.C., *Journal of molecular structure*, Sep. 15, 1990, Vol.237, Workshop on Horizons in Hydrogen Bond Research, 9th, Zeist, Netherlands, Sep. 10-15, 1989. Proceedings. Edited by A.J. Barnes et al, p.221-232, 18 refs.
Hydrogen bonds, Water structure, Amorphous ice, Supercooling, Molecular structure, Solid phases, Ice physics, Temperature effects, Density (mass/volume).

46-1094
Mathematical modeling of a snow-powder avalanche in the framework of the equations of two-layer shallow water.
Nazarov, A.N., *Fluid dynamics*, July 1991, 2o(1), p.70-75, Translated from Akademii nauk SSSR, Mekhanika zhidkosti i gaza. 15 refs.
Avalanche modeling, Avalanche mechanics, Turbulent flow, Mass transfer, Snow air interface, Snow physics, Mathematical models, Layers, Avalanche forecasting.

46-1095
Experimental study of high-speed friction on ice.
Kozlov, I.I., et al, *Fluid dynamics*, July 1991, 26(1), p.145-147, Translated from Akademii nauk SSSR, Mekhanika zhidkosti i gaza. 10 refs.
Shugai, A.A.
Metal ice friction, Ice solid interface, Ice melting, Heat flux, Phase transformations, Liquid phases, Sliding, Low temperature tests, Fluid dynamics.

46-1096
Climatological characteristics and objective prediction of thunderstorms over Alaska.
Reap, R.M., *Weather and forecasting*, Sep. 1991, 6(3), p.309-319, 22 refs.
Thunderstorms, Lightning, Climatology, Weather forecasting, Statistical analysis, Forest fires, Topographic effects, Charge transfer, United States--Alaska.

46-1097
Objective guidance for 0-24 hour and 24-48 hour mesoscale forecasts of lake-effect snow using CART.
Burrows, W.R., *Weather and forecasting*, Sep. 1991, 6(3), p.357-378, 16 refs.
Snowfall, Lake effects, Weather forecasting, Accuracy, Statistical analysis, Synoptic meteorology, Wind factors, Climatology, Meteorological data.

46-1098
Observations and model simulations of transport and precipitation development in a seeded cumulus congestus cloud.
Huston, M.W., et al, *Journal of applied meteorology*, Oct. 1991, 30(10), p.1389-1406, 33 refs.
De Ajler, A.G., Kopp, F.J., Stith, J.L.
Cloud seeding, Precipitation (meteorology), Heterogeneous nucleation, Snow pellets, Simulation, Aerial surveys, Supercooled clouds, Clouds (meteorology).

46-1099
Ice water path estimation and characterization using passive microwave radiometry.
Vivekanandan, J., et al, *Journal of applied meteorology*, Oct. 1991, 30(10), p.1407-1421, 37 refs.
Turk, J., Bringi, V.N.
Precipitation (meteorology), Cloud physics, Remote sensing, Radiometry, Ice crystal optics, Scattering, Microwaves, Simulation, Brightness.

46-1100
Stable isotopes of oxygen and natural and fallout radionuclides used for tracing runoff during snowmelt in an arctic watershed.
Cooper, L.W., et al, *Water resources research*, Sep. 1991, 27(9), p.2171-2179, 44 refs.
Precipitation (meteorology), Watersheds, Snowmelt, Runoff, Isotope analysis, Chemical properties, Fallout, Snow hydrology, Tundra, Hydrogeochemistry.

46-1101
Inspection and reinforcement of buildings on pile foundations. [Obsledovanie i usilenie zdanii na svaĭnykh fundamentakh].
Ulitskiĭ, V.M., et al, Ispol'zovanie slabykh i merzlykh gruntov v kachestve osnovaniĭ sooruzheniĭ; mezhvuzovskiĭ tematicheskiĭ sbornik trudov (Using weak and frozen ground as foundations of structures; interuniversity thematic collected papers). Edited by B.I. Dalmatov, Leningrad, Leningradskiĭ inzhenernostroitel'nyĭ institut, 1990, p.14-21, In Russian.
Osokin, A.I., Laskin, M.B.
Piles, Buildings, Pile structures, Foundations, Seasonal freeze thaw, Analysis (mathematics).

46-1102
Effect of the stress state on frost heaving ground and forecasting the degree of deformation of the freezing base of a shallow foundation. [Vliianie napriazhennogo sostoianiia na puchinistye svoĭstva grunta i prognoz velichiny deformatsiĭ promerzaiushchego osnovaniia malozaglublennogo fundamenta].
Karlov, V.D., et al, Ispol'zovanie slabykh i merzlykh gruntov v kachestve osnovaniĭ sooruzheniĭ; mezhvuzovskiĭ tematicheskiĭ sbornik trudov (Using weak and frozen ground as foundations of structures; interuniversity thematic collected papers). Edited by B.I. Dalmatov, Leningrad, Leningradskiĭ inzhenernostroitel'nyĭ institut, 1990, p.72-83, In Russian. 10 refs.
Batkhuiag, B.
Frost heave, Soil freezing, Deformation, Foundations, Forecasting, Freeze thaw cycles, Thaw depth, Frozen ground mechanics, Stresses.

46-1103
Stability of tropospheric OH during ice ages, interglacial epochs and modern times.
Pinto, J.P., et al, *Tellus*, Nov. 1991, 43B(5), p.347-352, 28 refs.
Khalil, M.A.K.
Ice cores, Ice composition, Air pollution, Paleoclimatology, Atmospheric composition.
Hydroxyl (OH) radicals remove many man-made and natural gases from the atmosphere and therefore play a key role in global tropospheric chemistry. Recent increases in CH4 and CO have caused concern that the levels of OH may decrease, thus reducing the capacity of the atmosphere to remove and control man-made pollutants. OH concentrations were calculated over a wide range of climatic conditions to examine its long term stability and to determine the major factors that may cause changes in its levels. A one-dimensional photochemical model, the concentrations of CH4 and N2O from polar ice cores and the current understanding of the sources and sinks of CO, NOy and other gases involved in OH chemistry were used. It is found that mean OH concentrations are stabilized against changes, even though the climatic conditions and atmospheric trace gas composition change considerably between ice-ages, inter-glacial periods and the present. In these transitions, the more rapid destruction of OH from increased CH4 and CO is compensated by increases in the production processes. Calculations indicate that only a small part of the 5-fold increase of methane between the present and the peak of the last ice age is due to changes in OH levels. (Auth.)

46-1104
Remarks on the deuterium excess in precipitation in cold regions.
Fisher, D.A., *Tellus*, Nov. 1991, 43B(5), p.401-407, 17 refs.
Ice cores, Isotope analysis, Meteorological factors, Ice crystals, Antarctica--East Antarctica
Jouzel and Merlivat developed and used an expression for the kinetic fractionation coefficients alpha-k, and greatly improved the predictions of delta(O-18) and *d*, (the deuterium excess) in East Antarctica. The alpha-k coefficient is re-derived in terms of ambient cloud temperatures and is used to re-calculate their single-source East Antarctic simulations. While the "improved" alpha-k produces virtually no change in the *delta*'s, there is a small change in predicted *d*'s. However, no matter which alpha-k is used, the simulated *d*'s are very sensitive to the supersaturation history of the precipitating air mass. The single-source model is run for a wide range of supersaturation histories. Averaging the resulting suite of delta(O-18) and *d* solutions gives reasonable and stable *d* predictions. The temperature *Ts* at which clouds switch from being supercooled water drops to ice crystals depends in part on the microphysical loading of the air. The value of *Ts* significantly influences the *d*'s and even *delta*'s predicted. Thus ice-core microparticles *d* and *delta* might be "process related". (Auth.)

46-1105
Ground-based infrared measurements of the global distribution of ozone in the atmosphere of Mars.
Espenak, F., et al, *Icarus*, Aug. 1991, 92(2), p.252-263, 42 refs.
Mumma, M.J., Kostiuk, T., Zipoy, D.
Mars (planet), Planetary environments, Atmospheric composition, Ozone, Photochemical reactions, Infrared spectroscopy, Seasonal variations, Global change.

46-1106
Rotationally resolved midultraviolet studies of Triton and the Pluto/Charon system I: IUE results.
Stern, S.A., et al, *Icarus*, Aug. 1991, 92(2), p.352-341, 27 refs.
Brosch, N., Barker, E.S., Gladstone, G.R.
Extraterrestrial ice, Satellites (natural), Photometry, Albedo, Scattering, Triton, Ultraviolet radiation, Spectra.

46-1107
Modeling of the thermal behavior and of the chemical differentiation of cometary nuclei.
Espinasse, S., et al, *Icarus*, Aug. 1991, 92(2), p.350-365, 36 refs.
Klinger, J., Ritz, C., Schmitt, B.
Extraterrestrial ice, Porous materials, Ice sublimation, Heat transfer, Amorphous ice, Chemical composition, Simulation, Mathematical models, Vapor transfer.

46-1108
Europa's phase curve: implications for surface structure.
Domingue, D.L., et al, *Icarus*, Mar. 1991, 90(1), p.30-42, 39 refs.
Hapke, B.W., Lockwood, G.W., Thompson, D.T.
Extraterrestrial ice, Satellites (natural), Regolith, Photometry, Albedo, Scattering, Surface roughness, Radiation absorption.

46-1109
Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers. [Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov].
Komarova, E.V., ed, Gor'kii, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, 142p., In Russian. For individual papers see 46-1110 through 46-1120.
Icebreakers, Ice mechanics, Ice solid interface, Cold weather performance, Design, Ice physics, Ships, Ice navigation, Propellers, Mathematical models, Sea ice, Engines, Ship icing, Ice cover effect, Ice acoustics.

46-1110
Ship performance in ice in shallow water. [Rabota sudov vo l'dakh na melkovod'e].
Barabanov, N.V., Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kii, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.5-10, In Russian.
Ships, Icebreakers, Ice navigation, Cold weather performance.

46-1111
Basis for the requirements of the Ministry of the River Fleet for future additional icebreakers to the year 2000. [Obosnovanie potrebnosti Minrechflota v dopolnitel'nykh ledokolakh na perspektivu do 2000 goda].
Shutov, V.L., Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.10-12, In Russian.
Icebreakers, Ships, Economic analysis, River ice.

46-1112
Principles for the prioritized design of icebreaker platforms on air cushions. [Printsipy prioritetnogo proektirovaniia ledokol'nykh platform na vozdushnoĭ podushke].
Zuev, V.A., et al, Proektirovanie, teoriia i prochnost' sudov plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.12-22, In Russian. 4 refs.
Dekhtiar, M.B.
Design criteria, Design, Icebreakers, Air cushion vehicles, Analysis (mathematics).

46-1113
Problem of modeling ship movement in pack ice. [K voprosu o modelirovanii dvizheniia sudna v sploshnykh l'dakh].
Kashtelian, V.I., Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, *Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.22-26,* In Russian. 7 refs.
Ice breaking, Ice navigation, Pack ice, Ice solid interface, Ice cover strength, Mathematical models.

46-1114
Modeling the movement of icebreaking agents in a continuous ice field. [Modelirovanie dvizheniia ledorazrushaiushchikh sredstv v sploshnom ledianom pole].
Beliakov, V.B., Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.26-37, In Russian. 7 refs.
Icebreakers, Ice breaking, Pack ice, Ice models, Mathematical models.

46-1115
Converting an ice resistance model to real conditions. [O pereschete ledovogo soprotivleniia *modeli* na naturu].
Gramuzov, E.M., Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.37-41, In Russian. 7 refs.
Ice models, Ice cover strength, Mathematical models.

46-1116
Effect of a bulb in the bow tip on resistance to movement in ice debris. [Vliianie bul'ba v nosovoĭ okonechnosti na soprotivlenie dvizheniiu v oblomkakh l'da].
Soldatkin, O.B., Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.42-44, In Russian. 2 refs.
Ships, Ice navigation, Design, Ice solid interface.

46-1117
Method of calculating the speed of the automatic movement of a transport ship in pack ice (in the example of the SA-15 type ship). [Sposob rascheta skorosti avtonomnogo dvizheniia transportnogo sudna v sploshnykh l'dakh (na primere sudna tipa SA-15)].
Ionov, B.P., et al, Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.44-54, In Russian. 8 refs.
Kolbatov, P.V., Utusikov, IU.D.
Ice navigation, Icebreakers, Ships, Analysis (mathematics), Velocity measurement, Pack ice, Ice solid interface.

46-1118
Experimental studies on the maneuverability of icebreakers and ships in ice. [Eksperimental'nye issledovaniia manevrennosti ledokolov i sudov vo l'dakh].
Ionov, B.P., et al, Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.55-65, In Russian. 9 refs.
Utusikov, IU.D., Golovchanskiĭ, F.I.
Ships, Icebreakers, Ice navigation, Cold weather performance, Ice solid interface, Analysis (mathematics).

46-1119
Effect of bow propellers on propulsion performance and handling of icebreakers in ice. [Vliianie nosovykh vintov na ledovuiu khodkost' i upravliaemost' ledokolov].
Kazakov, A.T., Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). *Edited by E.V. Komarova, Gor'kiĭ.* Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.65-67, In Russian.
Propellers, Icebreakers, Cold weather performance, Ice navigation.

46-1120
Mathematical model of the stability of a platform on an air cushion in the transition mode. [Matematicheskaia *model' ostoĭchivosti platform na vozdushnoĭ* podushke v perekhodnom rezhime].
Dekhtiar, M.B., Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.67-80, In Russian. 4 refs.
Mathematical models, Air cushion vehicles, Stability, Ice navigation.

46-1121
Estimating the ice breaking capability of icebreaker platforms on air cushions. [K otsenke ledorazrushaiushcheĭ sposobnosti ledokol'nykh platform na vozdushnoĭ podushke].
Savateev, A.V., Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.80-86, In Russian. 1 ref.
Ice breaking, Air cushion vehicles, Icebreakers, Mathematical models.

46-1122
Studying the strength of ice acting on vertical structures. [Issledovanie prochnosti l'da, vozdeĭstvuiushchego na vertikal'nye konstruktsii].
Zanegin, V.G., et al, Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.86-93, In Russian. 3 refs.
Khrapatyĭ, N.G., Sukharev, IU.A.
Ice solid interface, Ice cover thickness, Ice cover strength, Ice physics, Analysis (mathematics).

46-1123
Method of calculating the rigid constraint on a boundary with combined finite element method models. [Sposob ucheta zhestkogo zashchemleniia na granitse v smeshannykh modeliakh metoda konechnykh elementov].
Kniaz'kov, V.V., et al, Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.94-98, In Russian. 3 refs.
Shakhverdi, G.G.
Boundary value problems, Mathematical models, Ice cover.

46-1124
Studying a mathematical model of ice breakup. [Issledovanie matematicheskoĭ *modeli razrusheniia* l'da].
Atsel, S.D., et al, Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.98-103, In Russian. 2 refs.
Gritsenko, O.N.
Ice breakup, Mathematical models, Ice solid interface, Computer applications.

46-1125
Determining the parameters of ice cover by seismic-acoustic methods. [Opredelenie parametrov ledianogo pokrova *seismoakusticheskimi metodami*].
Bykova, T.V., et al, Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.103-111, In Russian. 19 refs.
Vdovichenko, S.P.
Ice cover, Sea ice, Ice acoustics, Ice mechanics, Sound waves, Seismic surveys, Analysis (mathematics).

46-1126
Directional pattern of a vibrating source mounted on ice cover. [Diagramma napravlennosti vibroistochnika, ustanovlennogo na ledianom pokrove].
Vdovichenko, S.P., et al, Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.111-117, In Russian. 9 refs.
Gushchin, V.V.
Ice cover effect, Ice acoustics, Sound waves, Analysis (mathematics), Ice cover thickness, Wave propagation.

46-1127
Forecasting and minimizing the time for mooring operations for transport ships in ice conditions. [Prognozirovanie i minimizatsiia vremeni shvartovnykh operatsiĭ transportnykh sudov v ledovykh usloviiakh].
Braginets, O.N., Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.117-125, In Russian. 3 refs.
Ships, Winter maintenance, Cold weather operation, Forecasting, Moorings, Statistical analysis, Analysis (mathematics).

46-1128
Means of preventing the development of and the removal of an ice basin from floating objects. [Sredstva dlia preduprezhdeniia obrazovaniia i udaleniia ledianoĭ chashi s plavaiushchikh ob"ektov].
Volenko, B.S., et al, Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskiĭ sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kiĭ, Gor'kovskiĭ politekhnicheskiĭ institut, 1990, p.125-131, In Russian. 1 ref.
Aikashev, F.I.
Ship icing, Ice accretion, Ice removal, Countermeasures.

46-1129
Universal hydraulic press for determining the physical-mechanical characteristics of ice. [Universal'nyi gidravlicheskii press dlia opredeleniia fiziko-mekhanicheskikh kharakteristik l'da],
Novolodskii, I.D., et al, Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskii sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kii, Gor'kovskii politekhnicheskii institut, 1990, p.131-137, In Russian. 3 refs.
Koshkin, S.V., Kozin, V.M., Guliaev, A.S.
Ice physics, Test equipment, Ice mechanics, Sea ice, Analysis (mathematics).

46-1130
Circling movement of a ship under different operating modes of the ship engines. [Tsirkuliatsionnoe dvizhenie sudna pri raznykh rezhimakh raboty sudovykh dvigatelei],
Vasil'ev, S.A., Proektirovanie, teoriia i prochnost' sudov, plavaiushchikh vo l'dakh; mezhvuzovskii sbornik nauchnykh trudov (Design, theory, and strength of ships navigating in ice; interuniversity collected scientific papers). Edited by E.V. Komarova, Gor'kii, Gor'kovskii politekhnicheskii institut, 1990, p.137-142, In Russian. 3 refs.
Mathematical models, Engines, Ships, Ice navigation.

46-1131
Aggregation of algae released from melting sea ice: implications for seeding and sedimentation.
Riebesell, U., et al, *Polar biology*, Aug. 1991, 11(4), p.239-248, Refs. p.247-248.
Schloss, I., Smetacek, V.
Sea ice, Algae, Sedimentation, Ice cover effect, Antarctica—Weddell Sea.
Factors influencing the fate of ice algae released from melting sea ice were studied during a RV *Polarstern* cruise to the northwestern Weddell Sea. The large-scale phytoplankton distribution patterns across the receding ice edge and small-scale profiling of the water column adjacent to melting ice floes indicated marked patchiness on both scales. The contribution of typical ice algae to the phytoplankton was not significant. In experiments simulating the conditions during sea ice melting, ice algae revealed a strong propensity to form aggregates. Differences in the aggregation potential were found for algal assemblages collected from the ice interior and the infiltration layer. Aggregates were of a characteristic structure, consisting of monospecific microaggregates which are likely to have formed in the minute brine pockets and channels within the ice. Sinking rates of aggregates were three orders of magnitude higher than those of dispersed ice algae. These observations, combined with the negligible seeding effect of ice algae found during this study, suggest that ice algae released from the melting sea ice are subject to rapid sedimentation. (Auth. mod.)

46-1132
Laboratory simulation, a tool for comet research.
Grün, E., et al, *Geophysical research letters*, Feb. 1991, 18(2), p.245-248, 16 refs.
Kochan, H., Seidensticker, K.J.
Extraterrestrial ice, Simulation, Laboratory techniques, Ice physics, Low temperature tests, Chemical composition, Low temperature research.

46-1133
KOSI?.
Keller, H.U., et al, *Geophysical research letters*, Feb. 1991, 18(2), p.249-252, 17 refs.
Markiewicz, W.J.
Extraterrestrial ice, Simulation, Ice sublimation, Heat transfer, Vapor diffusion, Porous materials, Surface properties, Radiation absorption, Low temperature research.

46-1134
Visible and near IR albedo measurements of ice/dust mixtures.
Oehler, A., et al, *Geophysical research letters*, Feb. 1991, 18(2), p.253-256, 13 refs.
Neukum, G.
Extraterrestrial ice, Simulation, Radiation absorption, Porous materials, Albedo, Ice sublimation, Surface energy, Low temperature research, Scattering.

46-1135
Energy balance of the KOSI 4 experiment.
Grün, E., et al, *Geophysical research letters*, Feb. 1991, 18(2), p.257-260, 16 refs.
Extraterrestrial ice, Simulation, Heat flux, Ice sublimation, Radiation absorption, Dust, Latent heat, Surface properties, Low temperature research.

46-1136
Thermal histories of the KOSI samples.
Benkhoff, J., et al, *Geophysical research letters*, Feb. 1991, 18(2), p.261-264, 10 refs.
Spohn, T.
Extraterrestrial ice, Simulation, Ice sublimation, Thermal regime, Surface temperature, Temperature measurement, Carbon dioxide, Low temperature research.

46-1137
Effect of non-volatile porous layers on temperature and vapor pressure of underlying ice.
Kömle, N.I., et al, *Geophysical research letters*, Feb. 1991, 18(2), p.265-268, 9 refs.
Extraterrestrial ice, Simulation, Porous materials, Dust, Ice sublimation, Vapor pressure, Temperature effects, Surface structure, Low temperature research.

46-1138
Gas release from ice/dust mixtures.
Hesselbarth, P., et al, *Geophysical research letters*, Feb. 1991, 18(2), p.269-272, 12 refs.
Extraterrestrial ice, Simulation, Vapor diffusion, Porous materials, Ice sublimation, Radiation absorption, Carbon dioxide, Low temperature research.

46-1139
KOSI: gas drag derived from ice/dust-particle trajectories.
Kochan, H., et al, *Geophysical research letters*, Feb. 1991, 18(2), p.273-276, 12 refs.
Markiewicz, W.J., Keller, H.U.
Extraterrestrial ice, Simulation, Porous materials, Ice sublimation, Radiation absorption, Dust, Photointerpretation, Low temperature research.

46-1140
Measurement of the volatile component in particles emitted from an ice/dust mixture.
Mauersberger, K., et al, *Geophysical research letters*, Feb. 1991, 18(2), p.277-280, 5 refs.
Extraterrestrial ice, Simulation, Gases, Porous materials, Sublimation, Radiation absorption, Particles, Carbon dioxide, Low temperature research.

46-1141
Dust emission of mineral/ice mixtures: residue structure and dynamical parameters.
Thiel, K., et al, *Geophysical research letters*, Feb. 1991, 18(2), p.281-284, 10 refs.
Kölzer, G., Kohl, H.
Extraterrestrial ice, Simulation, Porous materials, Dust, Sublimation, Radiation absorption, Particle size distribution, Low temperature research.

46-1142
Cometary analogue material: preparation, composition, and thin section petrography.
Stöffler, D., et al, *Geophysical research letters*, Feb. 1991, 18(2), p.285-288, 9 refs.
Extraterrestrial ice, Simulation, Porous materials, Snow crystal structure, Sublimation, Grain size, Thin sections, Low temperature research.

46-1143
Comet simulation experiments as a prelude to the CRAF and ROSETTA missions.
Bar-Nun, A., *Geophysical research letters*, Feb. 1991, 18(2), p.289-291, 21 refs.
Extraterrestrial ice, Research projects, Simulation, Gases, Porous materials, Ice sublimation, Low temperature research.

46-1144
Arctic and global change.
Symposium on the Arctic and Global Change, Ottawa, Oct. 25-27, 1989, Washington, D.C., Climate Institute, 1990, 156p., Refs. passim. For selected papers see 46-1145 through 46-1149.
McCulloch, J.A.W., ed.
Global warming, Air ice water interaction, Ocean environments, Environmental impact, Climatic changes.

46-1145
Environmental issues related to climate change in northern high latitudes.
Roots, E.F., Symposium on the Arctic and Global Change, Ottawa, Oct. 25-27, 1989. Proceedings. Edited by J.A.W. McCulloch. Arctic and global change, Washington, D.C., Climate Institute, 1990, p.6-31, 5 refs.
Global warming, Environmental impact, Air ice water interaction, Climatic changes, Permafrost distribution.

46-1146
Arctic Ocean: its role in the global climate engine.
Clarke, R.A., et al, Symposium on the Arctic and Global Change, Ottawa, Oct. 25-27, 1989. Proceedings Edited by J.A.W. McCulloch. Arctic and global change, Washington, D.C., Climate Institute, 1990, p.42-57, 14 refs.
Jones, E.P.
Global warming, Air ice water interaction, Sea ice distribution, Ocean currents, Marine atmospheres.

46-1147
Global climate change and the marine physical environment.
Mysak, L.A., Symposium on the Arctic and Global Change, Ottawa, Oct. 25-27, 1989. Proceedings Edited by J.A.W. McCulloch. Arctic and global change, Washington, D.C., Climate Institute, 1990, p.58-64, 10 refs.
Global warming, Air ice water interaction, Ocean environments, Sea ice distribution.

46-1148
Impact of global change on arctic marine ecosystems.
Alexander, V., Symposium on the Arctic and Global Change, Ottawa, Oct. 25-27, 1989. Proceedings Edited by J.A.W. McCulloch. Arctic and global change, Washington, D.C., Climate Institute, 1990, p.65-71, 3 refs.
Global warming, Marine biology, Cryobiology, Ocean environments, Ecosystems, Algae, Sea ice.

46-1149
Impacts of climate warming on transportation in the Canadian Arctic.
Lonergan, S., et al, Symposium on the Arctic and Global Change, Ottawa, Oct. 25-27, 1989. Proceedings Edited by J.A.W. McCulloch. Arctic and global change, Washington, D.C., Climate Institute, 1990, p.81-95.
Woo, M.K.
Global warming, Transportation, Environmental impact, Logistics, Economic analysis.

46-1150
Cause and mechanism of fluctuation of alpine glaciers.
Diurgerov, M.B., *Journal of glaciology and geocryology*, June 1991, 13(2), p.95-106, In Chinese with English summary. 22 refs.
Mountain glaciers, Glacier oscillation, Glacier mass balance.

46-1151
Peculiarities of mass exchange of the flat-top glaciers at the central Tianshan.
Mikhalenko, V.N., *Journal of glaciology and geocryology*, June 1991, 13(2), p.107-114, In Chinese with English summary. 7 refs. For a Russian version with English summary see 44-341.
Mountain glaciers, Glacier mass balance, Mass transfer.

46-1152
Developing and physical characteristics of first-year sea ice in Great Wall Bay and its adjacent area by King George Island, Antarctica.
Qin, D.H., *Journal of glaciology and geocryology*, June 1991, 13(2), p.115-130, In Chinese with English summary. 16 refs.
Sea ice, Ice salinity, Ice structure, Ice composition, Floating ice, Antarctica—King George Island.
The detailed evolution and the profile of ice thickness, pH value, salinity, the structure and fabric of the first-year sea ice in Great Wall Bay and its adjacent area on King George I. are described. The period of sea ice cover is short, and its stability is low. Ice core analysis shows that the sea ice consists mainly of snow ice in the Bay (over 70% of the thickness), and that the sea ice increases both upwards and downwards, characterized by snow ice upwards and congelation ice downwards. Snow ice contains interstitial water which refreezes and remelts alternatively during the seasons with weather changes. This process makes it difficult to calculate the ice thickness from the classical Stefan formula. There is a dendritic ice phenomenon, with ice plates and brine lamellae both in congelation ice and the bottom of snow ice. In addition, the ice-axis alignment direction in congelation ice and snow ice is different from that in other regions. The ice fabric diagram of congelation ice is a weak small circle, and that of snow ice has a shape of central symmetry. (Auth. mod.)

46-1153
Distributive characteristics of frozen ground in the east of Qinghai-Xizang Plateau
Wang, S.L., et al, *Journal of glaciology and geocryology*, June 1991, 13(2), p.131-140, In Chinese with English summary. 4 refs.
Luo, X.R., Guo, P.F.
Permafrost distribution, Active layer, Seasonal freeze thaw, Permafrost surveys, China—Qinghai-Xizang Plateau.

46-1154
Discussion on the questions of development of Heigou Glacier No.8, Bogda-peak region.
Wang, Z.T., *Journal of glaciology and geocryology*, June 1991, 13(2), p.141-146,158, In Chinese with English summary. 6 refs.
Mountain glaciers, Glacier surveys, Glacier alimentation, Glacier thickness, China—Tian Shan.

46-1155
Periglacial periods and Pleistocene environment in Western Mountain of Beijing, China.
Guo, X.D., et al, *Journal of glaciology and geocryology*, June 1991, 13(2), p.159-167, In Chinese with English summary. 15 refs.
Yan, F.H., Jin, Z.X.
Periglacial processes, Paleoclimatology, Pleistocene, Age determination, Fossil ice, Geochronology.

46-1156
Explanation of electrical d.c. resistivity sounding at the head waters of Urumqi River, Tianshan.
Zeng, Z.G., et al, *Journal of glaciology and geocryology*, June 1991, 13(2), p.169-176, In Chinese with English summary. 4 refs.
Qiu, G.Q.
Permafrost thickness, Ground ice, Sounding, Electrical resistivity, Rock glaciers, China—Tian Shan.

46-1157
Buried humus soil and syngenetic permafrost around the Daxigou meteorological station at the source of the Urumqi River.
Zhao, L., et al, *Journal of glaciology and geocryology*, June 1991, 13(?), p.177-180, In Chinese with English summary. 6 refs.
Qiu, G.Q.
Permafrost origin, Permafrost depth, Paleoclimatology, Organic soils, Soil dating, Permafrost dating, China—Tian Shan.

46-1158
Preliminary report on the Sino-USSR joint glaciological expedition to Gongga Shan.
Su, Z., et al, *Journal of glaciology and geocryology*, June 1991, 13(2), p.181-184, In Chinese.
Orlov, A.V.
Glacier surveys, Expeditions, Mountain glaciers, China—Qinghai-Xizang Plateau.

46-1159
Polar ices. [Les glaces polaires],
Souchez, R.A., Brussels, Editions de l'Université de Bruxelles, 1988, 156p., In French. Refs. p.151-153.
DLC GB2595.S68
Paleoclimatology, Ice sheets, Sea ice, Ice formation, Climatic factors, Polar regions.
In the first part of this book, the ices of today are discussed: how they spread out as ice sheets, permafrost and sea ice, and how they relate to the atmosphere and climate. Part 2 explains the mechanism of polar ice formation, including snow to ice conversion, the formation differences between cold and temperate ice and glacier flow rates, and the different processes involved in fresh water ice and salt ice formation. Parts 3 and 4 discuss past glaciations and ancient ice sheets as a key to the reconstruction of the paleoclimate of polar regions. The concluding pages briefly address man's economic and political involvement in the polar regions.

46-1160
FRAM atlas of the southern oceans.
Webb, D.J., et al, Swindon, England, Natural Environment Research Council, 1991, 67p., 13 refs.
Killworth, P.D., Coward, A.C., Thompson, S.R.
Ocean currents, Oceanographic surveys, Sounding, Bottom topography, Water transport, Mathematical models, Maps.
The Fine Resolution Antarctic Model (FRAM) was developed especially as a model to determine the strength of the Antarctic Circumpolar Current and the transport of heat by the ocean from the tropics towards the pole. Data are presented in maps and charts. Part 1 shows temperature, salinity, velocity, and pressure in polar projections at selected depths from the surface to 3990 m. Part 2 shows temperature, salinity, and cross track velocity for the World Ocean Circulation Experiment (WOCE) planned hydrographic sections covered by the FRAM model at depths to 5000 m. Contrary to what has been thought previously, mid-ocean ridges do disturb the free flow of wind driven currents.

46-1161
Ice rafting, glacial-marine sediments, and siliceous oozes: South Atlantic/subantarctic Ocean.
Warnke, D.A., et al, Proceedings of the Ocean Drilling Program, Vol.114, Scientific results, subantarctic South Atlantic, edited by E.K. Mazzullo, College Station, TX, Texas A and M University, 1991, p.589-598, 75 refs.
Allen, C.P.
DLC QE39.T49b Vol.114 1987
Ice rafting, Sediments, Biomass, Water temperature, Sea ice distribution, Fossils.
In the modern southern ocean, very little debris is delivered to the sea by icebergs. Whatever debris may be present beneath the ice sheets is lost near the grounding line. Whatever till is present beneath ice streams is also lost near the grounding line, but it may significantly contribute to fine-sized suspensoids. The bulk of the ice-rafted debris encountered at ODP Leg 114 drill sites was delivered in the geologic past, when antarctic glaciers had greater erosive power. Whatever ice-rafted detritus is present is essentially only an admixture to rapidly accumulating siliceous oozes. These oozes present a paradox because, in general, primary production in the open southern ocean is quite low. However, because the preservation of antarctic diatoms is far better than their preservation in low latitudes, high sedimentation rates result. These relationships are explained either in terms of high flux rates during the growth season, or as the result of a "stressed ecosystem," given to significant fluctuations, or as a combination of both mechanisms. These relationships lead to uncertainties in the computation of apparent mass-accumulation rates (AMARs) of ice-rafted detritus; nevertheless, a clear picture of the changes in antarctic glaciation emerges. The most significant results of these investigations of ice-rafted detritus are the recognition of (1) the antiquity (about 23.5 Ma) of (albeit insignificant) ice-rafting to these latitudes, and (2) a period of increased ice-rafting activity and northward expansion of the zone of major iceberg melting. (Auth. mod.)

46-1162
History of ice rafting at Leg 114 sites, subantarctic/-South Atlantic.
Allen, C.P., et al, Proceedings of the Ocean Drilling Program, Vol.114, Scientific results, subantarctic South Atlantic, edited by E.K. Mazzullo, College Station, TX, Texas A and M University, 1991, p.599-607, 20 refs.
Warnke, D.A.
DLC QE39.T49b Vol.114 1987
Icebergs, Sediments, Marine geology, Geochronology.
The first influx of ice-rafted debris at Site 699, on the northeastern slope of the Northeast Georgia Rise, occurred at a depth of 69.94 m below seafloor (mbsf) in sediments of early Miocene age (23.54 Ma). This material is of the same type as later ice-rafted debris, but represents only a small percentage of the coarse fraction. Significant ice-rafting episodes occurred during Chron 5. Minor amounts of ice-rafted debris first reached Site 701, on the western flank of the Mid-Atlantic Ridge (8.78 Ma at 200.92 mbsf), and more arrived in the late Miocene (5.88 Ma). The first significant quantity of sand and gravel appeared at a depth of 107.76 mbsf (4.42 Ma). Site 704, on the southern part of the Meteor Rise, received very little or no ice-rafted debris prior to 2.46 Ma. At this time, however, the greatest influx of ice-rafted debris occurred at this site. This time of maximum ice rafting correlates reasonably well with influxes of ice-rafted debris at Sites 701 (2.24 Ma) and 699 (2.38 Ma), in consideration of sample spacing at these two sites. These peaks of ice rafting may be Sirius till equivalents, if the proposed Pliocene age of Sirius tills can be confirmed. After about 1.67 Ma, the apparent mass-accumulation rate of the sediments at Site 704 declined, but with major fluctuations. This decline may be the result of a decrease in the rate of delivery of detritus from Antarctica due to reduced erosive power of the glaciers or a northward shift in the polar front zone, a change in the path taken by the icebergs, or any combination of these factors. (Auth.)

46-1163
Preliminary results from China-Japan glaciological expedition in Tibet Plateau, 1989.
Yao, T.D., et al, *Journal of glaciology and geocryology*, Mar. 1991, 13(1), p.1-8, In Chinese with English summary. 2 refs.
Glacier surveys, Glacier oscillation, Paleoclimatology, China—Qinghai-Xizang Plateau.

46-1164
Improvement of saline soils in the seasonally frozen ground regions.
Qiu, G.Q., *Journal of glaciology and geocryology*, Mar. 1991, 13(1), p.9-16, In Chinese with English summary. 12 refs.
Saline soils, Active layer, Seasonal freeze thaw, Soil freezing, Soil chemistry, Desalting.

46-1165
Changes of the permafrost environment in Great Xian Ridges after disastrous forest fire—taking Gulian mining area as an example.
Liang, L.H., et al, *Journal of glaciology and geocryology*, Mar. 1991, 13(1), p.17-25, In Chinese with English summary. 5 refs.
Zhou, Y.W., Wang, J.C. Gao, X.W.
Forest fires, Thaw depth, Active layer, Permafrost transformation, Environmental impact, China—Greater Khingan Range.

46-1166
Research on using a Kalman filter in snowmelt runoff forecasting in the upper reaches of the Yellow River.
Song, Q., *Journal of glaciology and geocryology*, Mar. 1991, 13(1), p.27-34, In Chinese with English summary. 2 refs
Snowmelt, Runoff forecasting, Mathematical models.

46-1167
Primary analysis of water balance in Binggou Basin of Qilian Mountains.
Zhang, X.C., et al, *Journal of glaciology and geocryology*, Mar. 1991, 13(1), p.35-42, In Chinese with English summary. 2 refs.
Yang, Z.N.
Water balance, Runoff forecasting, Precipitation (meteorology), Mathematical models.

46-1168
Some features of the debris from the ice and new till at the terminus.
Zhou, S.Z., *Journal of glaciology and geocryology*, Mar. 1991, 13(1), p.43-50, In Chinese with English summary. 5 refs.
Moraines, Glacier flow, Talus, Grain size, Sediment transport, Unfrozen water content.

46-1169
Hydraulic conductivity of unsaturated soil and its changing regularity in saturated soil after freezing-thawing cycles.
Deng, Y.S., et al, *Journal of glaciology and geocryology*, Mar. 1991, 13(1), p.51-59, In Chinese with English summary. 3 refs.
Xu, X.Z.
Freeze thaw cycles, Soil water migration, Saturation, Soil freezing, Ground thawing.

46-1170
Carbon fixation and glacial epoch during geological history.
Wang, Z.M., *Journal of glaciology and geocryology*, Mar. 1991, 13(1), p.61-66, In Chinese with English summary. 9 refs.
Carbon dioxide, Ice age theory, Paleoclimatology.

46-1171
Soil wedge and ice-wedge pseudomorphs and their paleoclimatic implications.
Wang, B.L., et al, *Journal of glaciology and geocryology*, Mar. 1991, 13(1), p.67-76, In Chinese with English summary. 15 refs.
French, H.M.
Ice wedges, Permafrost indicators, Paleoclimatology.

46-1172
Modern climatic undulation and the change of cold and warm in recent 250 years in Balikun Basin.
Luo, G.P., et al, *Journal of glaciology and geocryology*, Mar. 1991, 13(1), p.77-83, In Chinese with English summary. 5 refs.
Yuan, Y.J.
Climatic changes, Glacier oscillation, China—Tian Shan.

46-1173
Effect of glacier-permafrost on isotopic formation and sampling method of C-14 dating.
Gu, G.S., et al, *Journal of glaciology and geocryology*, Mar. 1991, 13(1), p.84-90, In Chinese with English summary. 7 refs.
Chen, H.Q., Zhang, H.W.
Radioactive age determination, Permafrost dating, Soil dating, Carbon isotopes, Glacial deposits.

46-1174
Interpreting the permafrost thickness with logging curves.
Wang, X.L., *Journal of glaciology and geocryology*, Mar. 1991, 13(1), p.91-94, In Chinese with English summary.
Well logging, Permafrost thickness.

46-1175
Electrical loggings for permafrost characterization in cryogenic mounds in Nunavik, Quebec. [Caractérisation du pergélisol de buttes cryogènes à l'aide de diagraphies électriques au Nunavik, Québec],
Fortier, R., et al, *Permafrost and periglacial processes*, Apr.-June 1991, 2(2), p.79-93, In French with English summary. 15 refs.
Lévesque, R., Seguin, M.K., Allard, M.
Permafrost structure, Frozen ground temperature, Electrical measurement, Recording, Frost mounds, Geocryology, Freezing points, Unfrozen water content, Electrical resistivity, Geophysical surveys.

46-1176
Solifluction and the role of permafrost creep, eastern Melville Island, N.W.T., Canada.
Bennett, L.P., et al, *Permafrost and periglacial processes*, Apr.-June 1991, 2(2), p.95-102, With French summary. 26 refs.
French, H.M.
Permafrost mass transfer, Frozen ground mechanics, Soil creep, Solifluction, Periglacial processes, Slope processes, Active layer, Sediment transport, Geocryology.

46-1177
Thermal gradients and rock weathering at low temperatures: some simulation data.
Hall, K., et al, *Permafrost and periglacial processes*, Apr.-June 1991, 2(2), p.103-112, With French summary. 28 refs.
Hall, A.
Frozen rock strength, Frozen rock temperature, Frost weathering, Thermal stresses, Insolation, Geocryology, Simulation, Frost shattering, Temperature gradients.
The heating of rock by insolation during subzero air temperatures may cause thermal stresses within that rock. The values of (delta)t may be such that fracturing due to thermal shock may occur. The uneven heating of a rock body may cause buttressing of the heated faces such that thermal stresses are accentuated. Upon removal of the heat source, rapid cooling may occur and values of (delta)t may be sufficient to cause thermal shock. Replications of these thermal stresses may lead to fatigue and failure. The zone within which these stresses may occur is also one within which freeze-thaw can take place if water is present. It is suggested that thermally induced fracturing of rock in cold environments may be a significant but underrated process. Thermal results of laboratory simulation experiments are presented during which values of (delta)t = >500 C°h occurred for short periods. This paper constitutes part of the simulation experiments undertaken within the British Antarctic Survey's Fellfield Project. (Auth. mod.)

46-1178
Absence of frost sorting at an experimental site, Green Lakes Valley, Colorado Front Range, USA.
Warburton, J., *Permafrost and periglacial processes*, Apr.-June 1991, 2(2), p.113-122, With French summary. 18 refs.
Periglacial processes, Soil mechanics, Frost action, Sorting, Soil tests, Patterned ground, Soil composition, Grain size, Geocryology, Drainage.

46-1179
Differential frost heave, load casting and convection: converging mechanisms; a discussion of the origin of cryoturbations.
Van Vliet-Lanoë, B., *Permafrost and periglacial processes*, Apr.-June 1991, 2(2), p.123-139, With French summary. 76 refs.
Cryoturbation, Frozen ground mechanics, Patterned ground, Frost heave, Periglacial processes, Frost action, Soil surveys, Geocryology, Drainage.

46-1180
Periglacial stratified slope deposit in the valley and ridge province of central Pennsylvania, USA: sedimentology, stratigraphy, and geomorphic evolution.
Gardner, T.W., et al, *Permafrost and periglacial processes*, Apr.-June 1991, 2(2), p.141-162, With French summary. 59 refs.
Periglacial processes, Pleistocene, Glacial deposits, Slope processes, Stratigraphy, Paleoclimatology, Models, Frost shattering, Geocryology.

46-1181
Observations of buried glacier ice and massive segregated ice, western arctic coast, Canada: discussion.
Rampton, V.N., *Permafrost and periglacial processes*, Apr.-June 1991, 2(2), p.163-165, 21 refs. For article under discussion see 45-2232.
Glacier ice, Ground ice, Ice formation, Periglacial processes, Permafrost transformation, Subglacial drainage.

46-1182
Genesis of massive ice at 'Ice Mountain', Yenesei River, Western Siberia, according to results of gas analyses.
Arkhangelov, A.A., et al, *Permafrost and periglacial processes*, Apr.-June 1991, 2(2), p.167-170, With French summary. 4 refs.
Novgorodova, E.V.
Ground ice, Ice formation, Gases, Ice composition, Geocryology, Glaciation, Chemical analysis, Bubbles, Permafrost forecasting, Ice formation indicators.

46-1183
Triton's surface properties: a preliminary analysis from ground-based, Voyager photopolarimeter subsystem, and laboratory measurements.
Buratti, B.J., et al, *Journal of geophysical research*, Oct. 30, 1991, Vol.96 Supplement, p.19,197-19,202, 37 refs.
Satellites (natural), Extraterrestrial ice, Photometry, Remote sensing, Albedo, Surface properties, Scattering, Triton, Surface roughness, Regolith.

46-1184
Voyager photometry of Triton: haze and surface photometric properties.
Hillier, J., et al, *Journal of geophysical research*, Oct. 30, 1991, Vol.96 Supplement, p.19,203-19,209, 28 refs.
Helfenstein, P., Verbiscer, A., Veverka, J.
Satellites (natural), Extraterrestrial ice, Photometry, Haze, Albedo, Scattering, Surface properties, Triton, Mathematical models, Atmospheric composition.

46-1185
On the microphysical state of the surface of Triton.
Eluszkiewicz, J., *Journal of geophysical research*, Oct. 30, 1991, Vol.96 Supplement, p.19,217-19,229, 61 refs.
Satellites (natural), Extraterrestrial ice, Regolith, Surface properties, Frost, Recrystallization, Microstructure, Triton, Ice sintering, Grain size.

46-1186
Search for glazed surfaces on Triton.
Lee, P., et al, *Journal of geophysical research*, Oct. 30, 1991, Vol.96 Supplement, p.19,231-19,239, 25 refs.
Helfenstein, P., Veverka, J.
Satellites (natural), Extraterrestrial ice, Glaze, Specular reflection, Scattering, Photointerpretation, Triton, Spectra, Regolith, Surface properties.

46-1187
Remote sensing science for the nineties; Vols. 1, 2 and 3.
International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, 2488p., Refs. passim. For selected papers see 46-1188 through 46-1226.
Mills, R., ed.
DLC G70.39.I57 1990
Remote sensing, Geophysical surveys, Global change, Climatic changes, Airborne radar, Synthetic aperture radar, Sea ice distribution, Ice conditions, Oceanographic surveys, Image processing, Forest ecosystems, Radar photography.

46-1188
Microwave signatures for snow covered first-year sea ice.
West, R., et al, International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990. Digest, Vol.1. Remote sensing science for the nineties, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p.143-145, 5 refs.
Winebrenner, D.P., Tsang, L.
Sea ice, Snow cover effect, Backscattering, Radiometry, Grain size, Snow density, Microwaves, Polarization (waves).

46-1189
Polarization signatures of frozen and thawed forests of varying biomass.
Kwok, R., et al, International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990. Digest, Vol.1. Remote sensing science for the nineties, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p.337-340, 9 refs.
Aerial surveys, Radar photography, Synthetic aperture radar, Forest canopy, Scattering, Temperature effects, Polarization (waves), Remote sensing.

46-1190
HIRIS: a facility to measure both pattern and process in global change.
Goetz, A.F.H., International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990. Digest, Vol.1. Remote sensing science for the nineties, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p.341-344, 11 refs.
Geophysical surveys, Spaceborne photography, Global change, Imaging, Remote sensing, Spectra, Snow cover.

46-1191
Altimeter systems for high-resolution land and ice topographic mapping.
Im, E., International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990. Digest, Vol.1. Remote sensing science for the nineties, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p.823-826, 3 refs.
Topographic surveys, Airborne radar, Synthetic aperture radar, Ice cover, Height finding, Topographic maps, Resolution.

46-1192
Simulation of snow-depth estimation for multi-frequency radar.
Shi, J.C., et al, International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990. Digest, Vol.2. Remote sensing science for the nineties, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p.1129-1132, 8 refs.
Dozier, J., Davis, R.E.
Snow depth, Snow water equivalent, Spaceborne photography, Synthetic aperture radar, Backscattering, Snow cover effect, Polarization (waves), Simulation.

46-1193
Observation of internal structure of snowpack by microwave radar image.
Suzuki, M., et al, International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990. Digest, Vol.2. Remote sensing science for the nineties, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p.1137-1140, 6 refs.
Snow cover structure, Radar photography, Image processing, Snow stratigraphy, Microwaves, Remote sensing, Measuring instruments.

46-1194
Classification of snow cover and precipitation using SSM/I measurements: case studies.
Fiore, J.V., Jr., et al, International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990 Digest, Vol.2. Remote sensing science for the nineties, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p.1141-1144, 9 refs.
Grody, N.C.
Snow cover, Remote sensing, Radiometry, Classifications, Scattering, Precipitation (meteorology), Microwaves, Geophysical surveys.

46-1195
Microwave remote sensing of snowpack by MOS-1.
Fujino, K., et al, International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990. Digest, Vol.2. Remote sensing science for the nineties, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p.1145-1148, 5 refs.
Snow cover, Snow depth, Brightness, Radiometry, Spaceborne photography, Microwaves, Snow surveys, Correlation.

46-1196
Microwave signatures from land surface radiometry.
Aschbacher, J., International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990. Digest, Vol.2. Remote sensing science for the nineties, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p.1149-1152, 13 refs.
Terrain identification, Snow cover, Radiometry, Classifications, Remote sensing, Microwaves, Hydrology, Data processing.

46-1197
Optimized approach to mapping freezing terrain with SMMR data.
Zuerndorfer, B.W., et al, International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990. Digest, Vol.2. Remote sensing science for the nineties, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p.1153-1156, 9 refs.
England, A.W., Ulaby, F.T.
Soil freezing, Ground thawing, Classifications, Remote sensing, Radiometry, Surface properties, Brightness, Data processing.

46-1198
Comparison of Landsat Thematic Mapper digital enhancements of snow-avalanche paths: validation through GIS/remote sensing integration.
Walsh, S.J., et al, International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990. Digest, Vol.2. Remote sensing science for the nineties, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p.1161-1164, 7 refs.
Brown, D.G., Bian, L.
Avalanche tracks, Remote sensing, Spaceborne photography, Image processing, Resolution, Topographic effects, LANDSAT, Orientation.

46-1199
Digital database of remotely sensed data for glacial study in Antarctica.
Steiner, D.R., et al, International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990. Digest, Vol.2. Remote sensing science for the nineties, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p.1263-1266, 9 refs.
Ehlers, M.
Glacier mass balance, Water storage, Spaceborne photography, Image processing, Glacier oscillation, Climatic changes, Models, Data processing.
This paper describes the establishment of a digital database based on satellite images, acquired over time, to be used for monitoring the velocities of the ice flow of the polar ice caps. The area of study for this project is Byrd Glacier in East Antarctica. The images, acquired over a 10 year period, are registered and georeferenced using established ground control points. The images are enhanced and used to measure the movement of prominent surface features. The resulting database of digitally processed, "time lapsed" images provides a valuable source of information about glacial flow and ice sheet mass balance for use in global climate modeling. (Auth. mod.)

46-1200
Neural network vs. maximum likelihood classifications of spectral and textural features in visible, thermal, and passive microwave data.
Key, J., et al, International Geoscience and Remote Sensing Symposium (IGARSS '90), College Park, MD, May 20-24, 1990. Digest, Vol.2. Remote sensing science for the nineties, New York, Institute of Electrical and Electronics Engineers, Inc., 1990, p.1277-1280, 6 refs.
Maslanik, J.A., Schweiger, A.J.
Ice cover, Cloud cover, Remote sensing, Classifications, Image processing, Radiometry, Microwaves, Resolution.

46-1201
Neural network identification of sea-ice seasons in passive microwave data.
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46-1202
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Raney, R.K., Bhogal, A.S.
Ocean waves, Airborne radar, Synthetic aperture radar, Sea ice, Ice cover effect, Image processing, Ice edge, Resolution.

46-1203
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Sea ice, Ice conditions, Classifications, Aerial surveys, Synthetic aperture radar, Radar photography, Ice edge, Image processing.

46-1204
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Sea ice, Ice conditions, Ice forecasting, Remote sensing, Synthetic aperture radar, Ice models, Radar photography, Drift

46-1205
Comparison of SAR and scatterometer data collected during CEAREX.
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Sea ice, Ice conditions, Classifications, Airborne radar, Synthetic aperture radar, Image processing, Ice edge, Correlation.

46-1206
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Sea ice, Young ice, Radar echoes, Radiometry, Snow cover effect, Backscattering, Remote sensing, Resolution.

46-1207
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Sea ice, Snow cover effect, Snow water content, Radiometry, Brightness, Snow ice interface, Wetness, Oceanographic surveys, Antarctica—Weddell Sea.
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46-1208
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Sea ice, Classifications, Airborne radar, Synthetic aperture radar, Ice conditions, Backscattering, Image processing, Polarization (waves).

46-1209
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Sea ice, Ice conditions, Radar echoes, Microwaves, Classifications, Scattering, Polarization (waves), Oceanographic survey, Remote sensing.

46-1210
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Terrain identification, Remote sensing, Snow cover effect, Radiometry, Wave propagation, Microwaves, Attenuation, Data processing.

46-1211
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Sea ice, Airborne radar, Synthetic aperture radar, Surface properties, Ice edge, Backscattering, Snow cover effect, Image processing.

46-1212
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Fung, A.K., Bredow, J.
Sea ice, Scattering, Ice optics, Wave propagation, Remote sensing, Mathematical models, Surface roughness.

46-1213
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Sea ice, Pressure ridges, Airborne radar, Synthetic aperture radar, Surface properties, Classifications, Image processing, Resolution.

46-1214
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Kong, J.A., Shin, R.T.
Sea ice, Surface properties, Classifications, Radar echoes, Remote sensing, Backscattering, Polarization (waves), Wave propagation, Snow cover effect.

46-1215
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Jernigan, M.E.
Sea ice, Airborne radar, Classifications, Synthetic aperture radar, Image processing, Ice conditions, Surface structure.

46-1216
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Sea ice, Sensor mapping, Classifications, Radar photography, Synthetic aperture radar, Ice conditions, Image processing, Geophysical surveys, Resolution.

46-1217
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Sea ice, Classifications, Radar photography, Synthetic aperture radar, Image processing, Ice surveys, Analysis (mathematics), Resolution.

46-1218
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Sea ice, Drift, Classifications, Radar photography, Synthetic aperture radar, Image processing, Ice surveys, Surface properties, Resolution.

46-1219
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Sea ice, Classifications, Radar photography, Synthetic aperture radar, Resolution, Image processing, Statistical analysis, Salinity, Polarization (waves).

46-1220
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Sea ice, Classifications, Radar photography, Synthetic aperture radar, Accuracy, Image processing, Ice edge, Backscattering, Polarization (waves).

46-1221
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46-1222
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46-1223
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Sea ice distribution, Airborne radar, Synthetic aperture radar, Radiometry, Image processing, Accuracy, Ice navigation.

46-1224
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Forest ecosystems, Freeze thaw cycles, Airborne radar, Synthetic aperture radar, Backscattering, Remote sensing, Biomass, Temperature effects.

46-1225
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Forest ecosystems, Airborne radar, Synthetic aperture radar, Backscattering, Image processing, Resolution, Accuracy.

46-1226
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Forest canopy, Airborne radar, Synthetic aperture radar, Image processing, Backscattering, Temperature effects, Dielectric properties.

46-1227
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Sea ice, Ice elasticity, Ocean waves, Arctic Ocean.

46-1228
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Whillans, I.M.
Ice sheets, Ice cover thickness, Ice creep, Subglacial drainage, Antarctica—Ross Ice Shelf.
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46 1229
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Underground pipelines, Permafrost beneath structures, Grain size, Water content, Permafrost samplers, Permafrost surveys, Canada—Northwest Territories—Norman Wells.

46-1231
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Underground pipelines, Permafrost beneath structures, Thaw depth, Permafrost thermal properties, Probes, Permafrost samplers, Permafrost surveys, Dielectric properties, Canada—Northwest Territories—Norman Wells.

46-1232
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River basins, Stream flow, Climatic changes, Runoff forecasting, Snowmelt, Hydrology, Mathematical models, Temperature effects, Seasonal variations.

46-1233
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46-1234
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46-1235
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46-1236
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Rock glaciers, Distribution, Classifications, Infrared mapping, Periglacial processes, Climatic factors, Discontinuous permafrost, Geomorphology.

46-1237
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Runways, Permafrost bases, Ground thawing, Settlement (structural), Thermal insulation, Cellular plastics, Countermeasures, Cold weather construction, Subgrade preparation.

46-1238
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Ice strength, Mechanical tests, Laboratory techniques, Ice elasticity, Tensile properties, Temperature effects, Ice accretion, Aircraft icing, Accuracy.

46-1239
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Lake ice, Ice pileup, Ice breakup, Shores, Wind factors, Seasonal variations.

46-1240
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Trees (plants), Freezing, Damage, Altitude, Winter, Plant ecology, Cold tolerance, United States—New Hampshire—Mount Moosilauke.

46-1241
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Filion, L.
Shores, Subarctic landscapes, Eolian soils, Blowing snow, Snow cover effect, Soil formation, Wind factors, Sands, Vegetation factors.

46-1242
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Remote sensing, Radar echoes, Backscattering, Wave propagation, Terrain identification, Snow cover effect, Polarization (waves), Analysis (mathematics).

46-1243
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46-1244
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46-1245
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46-1246
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Heating, Hoarfrost, Ice formation, Coatings, Polymers, Ice prevention, Ice adhesion, Water vapor, Temperature effects

46-1247
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46-1248
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Drops (liquids), Cryogenics, Freezing, Heat transfer, Fluid flow, Liquid cooling, Analysis (mathematics), Manufacturing.

46-1249
Development of an air source heatpump driven by a diesel engine for melting snow on railroad tracks.
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Porous materials, Extraterrestrial ice, Gases, Ice sublimation, Ice heat flux, Thermal conductivity, Mathematical models, Thermodynamics, Temperature effects.

46-1251
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Ice crystal growth, Dendritic ice, Structural changes, Surface structure, Liquid cooling, Orientation, Anisotropy, Temperature effects.

46-1252
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Cold weather operation, Oil recovery, Petroleum transportation, Analysis (mathematics).

46-1253
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Equipment, Materials, Temperature effects, Cold weather operation, Metals, Cold weather performance, Steels, Welding, Joints (junctions), Damage, Deformation.

46-1254
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Steels, Hydrogen ion concentration, Cold weather performance, Analysis (mathematics).

46-1255
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Test equipment, Cold weather performance, Impact tests, Dynamic loads, Magnetic surveys.

46-1256
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46-1257
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Steels, Temperature effects, Welding, Materials, Joints (junctions), Cold weather performance, Chemical composition.

46-1258
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46-1259
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46-1282
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Avalanche modeling, Wet snow, Mathematical models.

46-1292
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Avalanche modeling, Avalanche forecasting, Computer programs.

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46-1294
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Exploration, Minerals, Mining, Economic development, Natural resources, Coal, United States—Alaska.

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Snowmelt, Water chemistry, Snow composition, Diurnal variations.

46-1298
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46-1299
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Ishida, M., *Seppyo*, Mar. 1991, 53(1), p.45-51, In Japanese. 8 refs.
Snowfall, Snow depth, Meteorological data, Air temperature, Precipitation (meteorology), Japan—Toyama Prefecture.

46-1300
Estimating method of the precipitation in snow storms.
Kobayashi, S., *Seppyo*, Mar. 1991, 53(1), p.53-59, In Japanese. 15 refs.
Snowfall, Blowing snow, Snowdrifts, Snowstorms, Wind factors, Antarctica—Mizuho Station.
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46-1301
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Oil spills, Bottom sediment, Pollution, Environmental impact, Ocean environments, United States—Alaska—Prince William Sound.

46-1302
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Bottom sediment, Oil spills, Oceanographic surveys, Sampling, Environmental impact, United States—Alaska—Prince William Sound.

46-1303
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Oil spills, Bottom sediment, Pollution, Core samplers, Chemical analysis, United States—Alaska—Prince William Sound.

46-1304
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Oil spills, Bottom sediment, Pollution, Radioactive isotopes, Isotopic labeling, United States—Alaska—Prince William Sound.

46-1305
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Oil spills, Bottom sediment, Marine biology, Microbiology, United States—Alaska—Prince William Sound.

46-1306
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Metamorphism (snow), Snow compression, Snow water content, Snow heat flux, Snow density, Snow thermal properties, Albedo, Mathematical models.

46-1307
Study of snow metamorphism: II. Observation and simulation.
Yamazaki, T., et al, *Seppyo*, June 1991, 53(2), p.125-133, In Japanese with English summary. 13 refs.
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Metamorphism (snow), Snow water content, Snow density, Snow temperature, Albedo, Periodic variations.

46-1308
Sublimation rate of collected blowing snow in a net type collector.
Sato, T., *Seppyo*, June 1991, 53(2), p.135-143, In Japanese with English summary. 9 refs.
Snow evaporation, Blowing snow, Snow air interface, Snow samplers, Mass transfer, Analysis (mathematics).

46-1309
Effects of various factors on rime icing. Part 1: effects of temperature and wind velocity.
Uchida, T., et al, *Seppyo*, June 1991, 53(2), p.145-154, In Japanese with English summary. 13 refs.
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Ice accretion, Icing, Temperature effects, Wind factors, Ice air interface.

46-1310
Properties of new snow immediately after snowfall in Nagaoka City.
Ikarashi, T., *Seppyo*, June 1991, 53(2), p.155-162, In Japanese. 19 refs.
Snowfall, Snow density, Snow cover structure, Snow temperature, Snow hardness, Japan—Nagaoka.

46-1311
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Kobiyama, M., et al, *Seppyo*, Sep. 1991, 53(3), p.195-200, In Japanese with English summary. 9 refs.
Snow thermal properties, Cooling systems, Cold storage, Ice refrigeration, Snow retention, Analysis (mathematics).

46-1312
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Bokura, T., *Seppyo*, Sep. 1991, 53(3), p.201-209, In Japanese. 19 refs.
Snowfall, Snowstorms, Japan—Aomori Prefecture.

46-1313
Experimental studies of pneumatic conveying system of snow.
Kobayashi, T., *Seppyo*, Sep. 1991, 53(3), p.211-216, In Japanese. 11 refs.
Snow removal, Ducts, Air flow.

46-1314
Forests as effective protection against snow avalanches.
Nitta, R., *Seppyo*, Sep. 1991, 53(3), p.217-224, in Japanese. 23 refs.
Avalanche engineering, Snow stabilization, Protective vegetation, Forest land.

46-1315
In situ observation of the internal structure of vapor-grown ice crystals by laser tomography.
Kakiuchi, H., et al, *Seppyo*, Sep. 1991, 53(3), p.225-229, In Japanese. 9 refs.
Gonda, T., Moriya, K.
Ice crystal structure, Ice crystal optics, Lasers, Light scattering.

46-1316
Cold Regions Research and Engineering Laboratory (CRREL).
Itagaki, K., *Seppyo*, Sep. 1991, 53(3), MP 3087, p.231-233, In Japanese.
Laboratories, Organizations, Research projects.

46-1317
Lichenometric study of Holocene rock glaciers and Neoglacial moraines, Frances Lake map area, southeastern Yukon Territory and Northwest Territories.
Dyke, A.S., *Canada. Geological Survey. Bulletin*, 1990, No.394, 33p., With French summary. 27 refs.
Rock glaciers, Moraines, Age determination, Lichens, Talus, Canada—Yukon Territory—Frances Lake.

46-1318
Time constants for the evolution of sea spray droplets.
Andreas, E.L., *Tellus*, Nov. 1990, 42B(5), MP 2975, p.481-497, 56 refs. For another version see 44-1221.
Sea spray, Air water interactions, Heat transfer, Moisture transfer, Drops (liquids), Mathematical models.
Sea spray droplets start with the same temperature as the ocean surface from which they form. In high-latitude, polar-low conditions, they therefore cool and evaporate in a relatively cold wind and may alter the air-sea exchange of heat and moisture. This paper presents equations that model the thermal and size (moisture) evolution of a spray droplet from the time it forms until it reaches equilibrium with its environment. The time required for a droplet to reach its equilibrium radius is always about three orders of magnitude larger than the time required to reach its equilibrium temperature. The thermal exchange is thus complete before the moisture exchange even starts. Consequently, the ambient humidity has little effect on the thermal exchange rate, and the initial droplet temperature has negligible effect on the moisture exchange rate. Spray droplets with initial radii less than 10 microns reach both thermal and size equilibrium with the ambient air. Droplets with initial radii greater than 300 microns fall back into the sea before exchanging appreciable heat or moisture and thus have little

impact on air-sea exchange. Future work must focus on the generation and turbulent transport of droplets with initial radii between 10 and 300 microns if we are able to understand how sea spray affects air-sea exchange.

46-1319

Integrating remotely sensed and spatial data into *water resources models*.

Merry, C.J., et al, MP 2976, Arnhem, Netherlands, International Association of Hydrogeologists (IAH), [1990], 8p., 10 refs. Presented at the International Symposium on Remote Sensing of Water Resources.

McKim, H.L.

Hydrology, Water reserves, Water balance, Remote sensing, Data processing.

The U.S. Army Corps of Engineers is developing an intelligent network system that will automate the acquisition of meteorologic and hydrologic data used in water resources models. The system is being developed to collect, analyze, and display the data for use in a workstation environment. Near-real-time models will be used to control the water resources to protect the environment. As a result, spatial database management and remote sensing techniques play an integral part in the hydrologic modelling process.

46-1320

Report of pit-wall observations of snow cover in Sapporo 1989-90.

Akitaya, E., et al, *Low temperature science (Teion kagaku). Series A Physical sciences. Data report*, 1990, No.49, p.1-7, In Japanese. 4 refs.

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Snow surveys, Snow depth, Snow hardness, Snow density, Snow temperature, Snow water content, Japan—Sapporo.

46-1321

Report of snow survey in the north and east region of Hokkaido.

Akitaya, E., et al, *Low temperature science (Teion kagaku). Series A Physical sciences. Data report*, 1990, No.49, p.9-13, In Japanese. 3 refs.

Snow surveys, Snow depth, Snow water content, Snow density, Snow temperature, Snow hardness, Japan—Hokkaido.

46-1322

Annual transition of soil temperature in the Taisetsu Mountains.

Kudo, G., et al, *Low temperature science (Teion kagaku). Series A Physical sciences. Data report*, 1990, No.49, p.15-32, In Japanese. 4 refs.

Kodama, Y.

Soil temperature, Mountain soils, Plant ecology, Vegetation patterns, Japan—Hokkaido.

46-1323

Distribution of pack ice off Okhotsk Sea coast of Hokkaido observed with sea ice radar network, January-April, 1990.

Ishikawa, M., et al, *Low temperature science (Teion kagaku). Series A Physical sciences. Data report*, 1990, No.49, p.33-53, In Japanese.

Sea ice distribution, Pack ice, Radar tracking, Okhotsk Sea, Japan—Hokkaido.

46-1324

Crystal space frame construction employed on arctic platform design.

Guillon, J.H., *Offshore*, May 1991, 51(5), p.44,47.

Offshore structures, Modular construction, Precast concretes, Offshore drilling, Ice loads.

46-1325

Naturalization of introduced plants in the Kola North. [Naturalizatsiia introdutsirovannykh rasteniĭ na Kol'skom Severe],

Andreev, G.N., et al, Apatity, Kol'skiĭ nauchnyĭ tsentr AN SSSR, 1990, 121p., In Russian with English summary. Refs. p.82-96.

Zueva, G.A.

Introduced plants, Plants (botany), Plant ecology, Cold tolerance, Statistical analysis.

46-1326

Explosion of droplets upon freezing in strong electrical fields. [Vzryv kapel' pri zamerzanii v sil'nykh elektricheskikh poliakh],

Dubrovich, N.A., et al, *Akademiia nauk SSSR. Doklady*, 1991, 319(2), p.322-324, In Russian. 7 refs.

Pershina, T.A.

Supercooling, Drops (liquids), Ice crystals, Ion density (concentration), Analysis (mathematics).

46-1327

Ice-water-vapor phase transformations in frozen soils. [O fazovykh perekhodakh led-voda-par v merzlykh gruntakh],

Tsypkin, G.G., *Akademiia nauk SSSR. Doklady*, 1991, 319(2), p.360-363, In Russian. 3 refs.

Phase transformations, Stefan problem, Frozen ground thermodynamics, Water vapor, Mathematical models, Frozen ground temperature.

46-1328

New data on natural conditions in the Late Pleistocene-Early Holocene in the high-latitude Asian Arctic and on the time of its occupation by ancient man. [Novye dannye o prirodnykh usloviiakh v kontse pozdnego pleĭstotsena-nachale golotsena v vysokoshirotnoĭ aziatskoĭ Arktike i vremeni ee zaseleniia drevnim chelovekom],

Makeev, V.M., et al, *Akademiia nauk SSSR. Doklady*, 1991, 319(2), p.435-437, In Russian.

Pitul'ko, V.V.

Pleistocene, Glacial geology, Geomorphology, Glacial deposits.

46-1329

Reduction of the total ozone content inside the polar cap after solar flares. [Umen'shenie obshchego soderzhaniia ozona vnutri poliarnoĭ shapki posle protonnykh vspyshek na solntse],

Shumilov, O.I., et al, *Akademiia nauk SSSR. Doklady*, 1991, 318(3), p.576-580, In Russian. 15 refs.

Ozone, Solar activity, Geophysical surveys.

46-1330

Conversion of optical radiation upon propagation through a thermodynamically irreversibly crystallizing layer of material. [Transformatsiia opticheskogo izlucheniia pri prokhozhdenii cherez termodinamicheski neobratimo kristallizuishchiisia sloĭ veshchestva],

Kachurin, L.G., et al, *Akademiia nauk SSSR. Doklady*, 1991, 318(3), p.586-589, In Russian. 7 refs.

Petkov, B.Kh.

Thermodynamics, Polarization (waves), Mathematical models, Ice crystal optics, Phase transformations, Light (visible radiation).

46-1331

Glaciodislocations of the Inner Tien Shan and Turkestan-Alay. [Gliatsiodislokatsii Vnutrennego Tian'-Shania i Turkestano-Alaia],

Pshenin, G.N., *Akademiia nauk SSSR. Izvestiia. Seria geograficheskaia*, Mar.-Apr. 1991, No.2, p.88-97, In Russian. 19 refs.

Glacial erosion, Glacial geology, Mountain glaciers, Glacier ablation, Geologic processes.

46-1332

Conversion of laser signal polarization upon propagating through a thermodynamically irreversibly crystallizing water aerosol. [Transformatsiia poliarizatsii lazernogo signala pri prokhozhdenii cherez termodinamicheski neobratimo kristallizuiushchiĭsia vodnyĭ aerozol'],

Kachurin, L.G., et al, *Akademiia nauk SSSR. Doklady*, 1991, 318(4), p.895-897, In Russian. 2 refs.

Petkov, B.Kh.

Phase transformations, Lasers, Polarization (waves), Temperature effects, Thermodynamics, Aerosols, Optical phenomena, Ice crystals, Water vapor.

46-1333

Marine scientific research and the Soviet Arctic.

Franckx, E., *Polar record*, Oct. 1991, 27(163), p.325-337, 88 refs.

Research projects, International cooperation, Ice navigation, Arctic Ocean.

46-1334

Scientific cruise reports of Arctic Expeditions ARK VI/1-4 of RV *Polarstern* in 1989.

Krause, G., ed, *Berichte zur Polarforschung*, 1991, No.87, 110p., With German summaries and itineraries.

Meincke, J., ed, Schwarz, H.J., ed.

Expeditions, Sea ice, Icebergs, Microwaves, Sediment transport, Barents Sea, Greenland Sea.

46-1335

Length of the solar cycle: an indicator of solar activity closely associated with climate.

Friis-Christensen, E., et al, *Science*, Nov. 1, 1991, 254(5032), p.698-700, 18 refs.

Lassen, K.

Climatic changes, Solar radiation, Sea ice.

46-1336

Stratospheric ozone in the 21st century. The chlorofluorocarbon problem.

Rowland, F.S., *Environmental science and technology*, Apr. 1991, 25(4), p.622-628, 8 refs.

Ozone, Atmospheric composition, Polar atmospheres, Meteorological data.

On the premise that the primary cause for the antarctic ozone loss, and the probable cause for the northern losses, is the increasing concentration in the stratosphere of anthropogenic chlorine which will persist for many decades, the relationship between increasing concentrations of CFC gases and ozone depletion is analyzed. The consequences are examined and suggestions are made on how to control and replace the CFCs.

46-1337

Rock fragments in Pleistocene ice sheets. [Oblomochnyĭ material v pleistotsenovykh lednikovykh pokrovakh],

Galgalas, A.I., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1990, No.69, p.3-17, In Russian with English summary. 23 refs.

Pleistocene, Moraines, Glacial deposits, Paleoclimatology.

46-1338

Applying numerical modelling to the description of avalanche movement. [Primenenie chislennogo modelirovaniia dlia opisaniia dvizheniia snezhnykh lavin],

Volodicheva, N.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1990, No.69, p.19-24, In Russian with English summary. 4 refs.

Mathematical models, Avalanches, Avalanche modeling, Avalanche mechanics.

46-1339

Synoptic conditions for the frequent descent of extremely large avalanches. [Sinopticheskie usloviia massovogo skhoda osobo krupnykh lavin],

Okolov, V.F., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1990, No.69, p.24-28, In Russian with English summary. 8 refs.

Shnyparkov, A.L.

Avalanche mechanics, Synoptic meteorology, Snow depth, Snow cover effect, Climatic factors, Snow accumulation.

46-1340

Characteristics of avalanche hazard in the subtropical belt of the Western Transcaucasus. [Kharakteristika lavinnoĭ opastnosti v subtropicheskom poiase Zapadnogo Zakavkaz'ia],

Abdushelishvili, K.L., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1990, No.69, p.28-35, In Russian with English summary. 5 refs.

Snow accumulation, Snowfall, Avalanche formation, Avalanche forecasting, Snow depth.

46-1341

Long range forecasts of avalanche activities for the Greater Caucasus and their reliability. [Dolgosrochnye prognozy lavinnoĭ deiatel'nosti dlia Bol'shogo Kavkaza i ikh opravdyvaemost'],

Oleĭnikov, A.D., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1990, No.69, p.35-42, In Russian with English summary. 14 refs.

Isaev, A.A., Vinogradova, V.V.

Avalanche forecasting, Long range forecasting, Accuracy, Air temperature, Precipitation (meteorology).

46-1342

Rational design of snow-protective structures. [Ratsional'noe proektirovanie snegozashchitnykh sredstv],

Komarov, A.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1990, No.69, p.42-47, In Russian with English summary. 7 refs.

Snow retention, Snow fences, Design, Snowdrifts, Analysis (mathematics).

46-1343

Conditions for the development of lake-burst floods generated by avalanche. [Usloviia obrazovaniia proryvnykh pavodkov lavinnogo genezisa],

Soldatov, A.I., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1990, No.69, p.47-49, In Russian with English summary. 4 refs.

Lakes, Avalanches, Dams, Floods, Water level, Analysis (mathematics).

46-1344

Forecasting glacial mudflows in the Central Caucasus Range. [Prognoz gliatsial'nykh seleĭ v tsentral'noĭ chasti Glavnogo Kavkazskogo khrebta],

Mal'neva, I.V., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1990, No.69, p.50-55, In Russian with English summary. 15 refs.

Seĭnova, I.B., Kononova, N.K., Berkovchenko, S.A.

Forecasting, Mudflows, Avalanches, Glacier ablation, Snowmelt.

46-1345
Method of background-based forecasting of glacial mudflows and its experimental application in Kazakhstan. [Metod fonovogo prognoza gliatsial'nykh selet i opyt ego primeneniia v Kazakhstane].
Plekhanov, P.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.55-59, In Russian with English summary. 2 refs.
Mudflows, Forecasting, Air temperature, Precipitation (meteorology), River basins, Lakes.

46-1346
Model of global climate during the period of the Pleistocene glaciation. [Model' global'nogo klimata v epokhu pleistotsenovykh oledenenii].
Kazanskii, A.B., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.59-65, In Russian with English summary. 13 refs.
Paleoclimatology, Water balance, Water level, Oceans, Mathematical models, Temperature variations, Ice volume, Pleistocene.

46-1347
Numerical modelling of the effect of snow accumulation rate and level of the World Ocean on the fluctuations of the East Antarctic ice sheet in the Late Pleistocene. [Chislennoe modelirovanie vliania skorosti akkumuliatsii snega i urovnia mirovogo okeana na kolebania lednikovogo pokrova Vostochnoi Antarktidy v pozdnem pleistotsene].
Nagurnyi, A.P., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.65-70, In Russian with English summary. 13 refs.
Savchenko, V.G., Potapenko, V.IU.
Pleistocene, Snow accumulation, Mathematical models, Water level, Ice sheets, Sea ice.
Features of numerical modelling of the East Antarctic ice sheet on the basis of zero-, and one- and two-dimensional models are analyzed. Estimations of the ice sheet stability under different temporal and spatial scales of averaging are made. Fluctuations of the free surface and margins of the East Antarctic ice sheet have been studied with the help of a one-dimensional nonstationary model, which includes the equations describing the dynamics of the ice sheet free surface, position of the grounding line and also the initial and boundary conditions. The response of the ice sheet to changes in the accumulation rate and the World Ocean level has been estimated numerically. Computations have been made with a time interval of 10 years, and embrace the last climatic cycle of 125,000 years. Numerical estimates of the fluctuations of free surface, grounding line and ice discharge into the Ocean were made. (Auth.)

46-1348
Modelling the ice cover evolution in Nordaustlandet. [Modelirovanie evoliutsii lednikovogo pokrova Severo-Vostochnoi Zemli].
Ignat'eva, I.IU., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.70-78, In Russian with English summary. 13 refs.
Krass, M.S., Macheret, IU.IA.
Mathematical models, Ice models, Ice cover, Glacier mass balance, Glacier ablation, Ice temperature.

46-1349
Pleistocene glaciation of mountains in Siberia: analysis and new data. [Pleistotsenovoe oledenenie gor Sibiri: analiz i novye dannye].
Shefnkman, V.S., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.78-85, In Russian with English summary. 27 refs.
Pleistocene, Glaciation, Glacial deposits, Mountains, Geomorphology, Paleoclimatology, Valleys, Lacustrine deposits.

46-1350
Impact of exogenous factors on glacier dynamics. [Vliianie ekzogennykh faktorov na dinamiku lednikov].
Kreiter, A.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.85-90, In Russian with English summary. 9 refs.
Air temperature, Temperature effects, Glacier tongues, Precipitation (meteorology), Glacier ablation, Mathematical models.

46-1351
Relationship of glaciology and cryolithology in the study of ice. [O sootnoshenii gliatsiologii i kriolitologii pri izuchenii l'da].
Koreisha, M.M., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.90-93, In Russian with English summary. 12 refs.
Glaciology, Geocryology, Lithology.

46-1352
Ground ice and surface ice in Western Siberia in the Pleistocene. [Podzemnye i poverkhnostnye l'dy Zapadnoi Sibiri v pleistotsene].
Kritsuk, L.N., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.93-102, In Russian with English summary. 19 refs.
Ground ice, Ground water, Geocryology, Ice wedges, Hydrogeology, Taliks, Naleds.

46-1353
Ground ice in ancient moraines of Tien Shan. [Podzemnye l'dy v drevnikh morenakh Tian'-Shania].
Gorbunov, A.P., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.102-107, In Russian with English summary. 9 refs.
Ermolin, E.D.
Ground ice, Moraines, Pleistocene.

46-1354
Systems of ice wedges in the sedimentary mantles of Central Yakutia. [Sistemy povtorno-zhil'nykh l'dov v pokrovnykh otlozheniiakh Tsentral'noi Iakutii].
Gravis, G.F., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.108-113, In Russian with English summary. 6 refs.
Ice wedges, Ice veins, Origin, Sediments.

46-1355
Remote studies of naled processes on the Putorana Plateau. [Distantsionnye issledovaniia nalednykh protsessov na plato Putorana].
Gienko, A.IA., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.113-117, In Russian with English summary. 10 refs.
Naleds, Remote sensing, Spaceborne photography, Icing, Ice volume.

46-1356
Current and ancient rock glaciers of Svanetia. [Sovremennye i drevnie kamennye gletchery Svanetii].
Rekhviashvili, A.V., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.117-120, In Russian with English summary. 14 refs.
Gobedzhishvili, R.G.
Rock glaciers, Glacier surveys, River basins.

46-1357
Ice formation and cryogenic heaving during the seasonal freezing of rocks. [L'doobrazovanie i kriogennoe puchenie pri sezonnom promerzanii porod].
Vtiurina, E.A., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.121-126, In Russian with English summary. 8 refs.
Ice formation, Frost heave, Frozen rocks, Geocryology.

46-1358
Liquid precipitation in the largest mountain-glacier regions of the Northern Hemisphere. [Zhidkie osadki v krupneishikh gornolednikovykh ratonakh Severnovo polushariia].
Davidovich, N.V., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.127-134, In Russian with English summary. 7 refs.
Precipitation (meteorology), Mountain glaciers, Statistical analysis.

46-1359
Relationship of the fluctuations of glacier tongues in the Alps to the annual mass balance. [Sviaz' kolebanii kontsov lednikov Al'p s godovym balansom massy].
Tiulina, T.IU., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.134-141, In Russian with English summary. 7 refs.
Correlation, Glacier tongues, Climatic factors, Glacier mass balance, Glacier oscillation, Analysis (mathematics).

46-1360
Methods of calculating and forecasting elements of the regime of the outburst-hazardous Mertsbakher Lake. [Metody rascheta i prognoza elementov rezhima proryvoopasnogo ozera Mertsbakhera].
Konovalov, V.G., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.141-147, In Russian with English summary. 7 refs.
Glacial lakes, Glacial hydrology, Floods, Flood forecasting, Glacial rivers, Runoff, Mathematical models.

46-1361
Temperature field in a glacier with regard for the effects of ice viscosity and creep. [Pole temperatur v lednike s uchetom vliania viazkosti i polzuchesti l'da].
Ivanov, A.I., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.148-153, In Russian with English summary. 5 refs.
Ice temperature, Ice creep, Viscosity, Ice elasticity, Ice thermal properties, Analysis (mathematics), Glacier ice, Thermal conductivity.

46-1362
Experimental study of seismic and acoustic signals from avalanches on the northern slope of Cheget Mountain. [Eksperimental'noe issledovanie seismicheskikh i akusticheskikh signalov snezhnykh lavin na severnom sklone gory Cheget].
Firstov, P.P., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.153-160, In Russian with English summary. 10 refs.
Avalanches, Snow acoustics, Avalanche mechanics, Seismic reflection, Analysis (mathematics).

46-1363
Calculating the mass of snow cover on the ground. [K raschetu massy snezhnogo pokrova na grunte].
Ledovskoi, I.V., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.161-166, In Russian with English summary. 8 refs.
Lobanova, G.V.
Snow cover, Analysis (mathematics), Snow cover distribution.

46-1364
Development of an instrumental base for the study of snow. [Razvitie pribornoi bazy snegovedeniia].
Samoilov, R.S., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.167-172, In Russian with English summary. 11 refs.
Ermakov, K.K., Ovcharenko, V.G.
Test equipment, Measuring instruments, Accuracy, Snow mechanics, Snow physics.

46-1365
Current potential and prospects for the development of technology for glacier drilling and borehole measurement. [Sovremennye vozmozhnosti i perspektivy razvitiia tekhniki bureniia lednikov i izmereni v skvazhinakh].
Zagorodnov, V.S., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.172-177, In Russian with English summary. 2 refs.
Borehole instruments, Measuring instruments, Ice coring drills, Drills, Drilling fluids.

46-1366
Automatic measurements of the dimensions of crystals and the concentration of inclusions in an ice core: methods and initial results. [Avtomaticheskie izmereniia razmerov kristallov i kontsentratsii vkliuchenii v ledianom kerne: metod i pervye rezul'taty].
Zagorodnov, V.S., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.177-184, In Russian with English summary. 11 refs.
Vatanabe, O., Fudzhin, E., Khatzenberg, Dzh.
Measurement, Ice crystal size, Ice crystals, Ice cores, Lasers.
With the use of laser sensors it was possible to experiment with automatic measurements of transverse dimensions of crystals in samples of artificial and natural antarctic ice obtained at Mizuho Station. Automatic measurements of the concentration and dimensions of air inclusions, and also the position of the C-axis of ice crystals continuously along the ice core were made. The theoretical rate of measurements of the above-mentioned parameters can reach 1000 measurements/sec or about 1 m/sec when the sensors move along the ice. Depending on the thickness of the ice plate, the variation range of the output signal of sensors with different positions of the C-axis of crystals is 0.5-5V. The theoretical resolution capacity of the method under the changed position of the C-axis is about 0.1 deg. Laser sensors allowed the inclusions with a diameter of about 1 micrometer in the ice core to be distinguished. In the near future experiments on automatic preparation of continuous microsections of the ice core will be conducted. The obstacle for receiving structural data with the use of the above-mentioned sensors is mainly due to the presence of thermic crevasses in ice cores obtained by a thermodrill in central Antarctica. (Auth. mod.)

46-1367
Correlation maps as a tool for glaciological studies. [Korreliatsionnye karty kak instrument gliatsiologicheskikh issledovanii],
Khromova, T.E., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.184-190, In Russian with English summary. 11 refs.
Glaciation, Correlation, Maps, Mapping, Analysis (mathematics).

46-1368
Strength and creep of artificial ice, produced by the spray-cone freezing method. [Prochnost' i polzuchest' iskusstvennogo l'da, vyrabatyvaemogo metodom dal'nestruinogo dozhdevaniia],
Ushakov, G.S., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.191-195, In Russian with English summary. 2 refs.
Artificial ice, Ice creep, Ice strength, Ice deformation, Ice elasticity, Stresses.

46-1369
Using a snow-and-ice mass or compacted ice for constructing a temporary railroad bed. [Ispol'zovanie snegol'da ili uplotnennogo snega pri stroitel'stve vremennogo zheleznodorozhnogo polotna],
Kasintsev, V.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.195-200, In Russian with English summary. 7 refs.
Borshchuk, I.L.
Railroads, Roadbeds, Snow (construction material).

46-1370
Experiments in the desalination of porous ice. [Eksperimenty po opresneniiu poristogo l'da],
Gokhman, V.V., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.201-204, In Russian with English summary. 4 refs.
Sosnovskii, A.V., Khodakov, V.G.
Desalting, Ice salinity, Ice structure, Brines.

46-1371
Snow-retaining structures. [Snegouderzhivaiushchie sooruzheniia],
Samoiliuk, V.I., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.204-208, In Russian with English summary. 7 refs.
Parpura, V.A., Samoiliuk, O.V.
Snow temperature, Snow recrystallization, Snow retention, Temperature distribution, Snow strength, Analysis (mathematics).

46-1372
Workshop and seminar of the section on glaciology, Fall 1989. [Rabochee soveshchanie i shkola-seminar sektsii gliatsiologii osen'iu 1989 g.],
Ushakov, A.I., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.209-218, In Russian.
Glaciology, Meetings, Antarctica—Mizuho Station, Antarctica—Lambert Glacier.
The first half of the Nov. 19 session was devoted to studies in the Antarctic. This report cites the scientists' names and the topics discussed at the session. These topics include the establishment of a new expert committee and its projects, analysis of the work by Soviet glaciologists in Antarctica, study of the interaction between glaciation and the ocean, Lambert Glacier, borehole drilling at Vostok Station, and the development of oases. In order to stimulate new basic research in the region, the general academic program "Antarctica" has already financed several projects.

46-1373
All-Union conference on "Snow and Ice Resources and the Hydroclimatic Regime of Intracontinental Mountain Regions". [Vsesoiuznaia konferentsiia "Snezhno-ledovye resursy i gidroklimaticheskii rezhim vnutrikontinental'nykh gornykh raionov"],
Osipova, G.B., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.219-222, In Russian.
Meetings, Glaciers, Periglacial processes.

46-1374
13th meeting of the editorial board of the "World atlas of snow and ice resources". [Trinadtsatoe zasedanie redkollegii Atlasa snezhno-ledovykh resursov mira],
Defer, N.N., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.223-224, In Russian.
Meetings, Maps, Natural resources, Snow, Ice.

46-1375
Soviet glaciological studies in 1989. [Sovetskie gliatsiologicheskie issledovaniia v 1989 godu],
Glazovskii, A.F., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1990, No.69, p.224-235, In Russian.
Research projects, Glaciology, Drilling.
This report is first divided according to general topic or region and then is subdivided into specific topics and the institutions sponsoring the research. The section on Antarctica includes such topics as drilling at the Amery Ice Shelf, Vostok Station, and the Mirnyy-Vostok traverse, carbon dioxide in the core, oscillation of the rim of the antarctic cover, 4 isotopic analyses, reconstruction of the paleoclimate, the snow-firn mass at the Mirnyy-Vostok traverse, and a chromograph of ice.

46-1376
Resistance of high-strength concrete to cold weather environments.
Ernzen, J.J., Austin, University of Texas, 1990, 375p., University Microfilms order No.DA9116852, Ph.D. thesis. 81 refs.
Concrete durability, Concrete freezing, Frost resistance, Cold weather performance, Freeze thaw tests, Air entrainment, Compressive properties.

46-1377
Time lag process in snowmelt runoff. I: Propagation of meltwater in snow pack.
Nomura, M., et al, *Low temperature science (Teion kagaku). Series A Physical sciences*, 1990, No.49, p.1-14, In Japanese with English summary. 7 refs.
Ishii, Y., Kodama, Y., Kobayashi, D.
Snowmelt, Snow hydrology, Runoff, Snow permeability, Water flow, Analysis (mathematics).

46-1378
Study on the mechanism of avalanche release at Mt. Niseko, Hokkaido, January 1990.
Akitaya, E., et al, *Low temperature science (Teion kagaku). Series A Physical sciences*, 1990, No.49, p.15-23, In Japanese with English summary. 6 refs.
Shimizu, H., Naruse, R., Fukuzawa, T.
Avalanche triggering, Avalanches, Snow cover stability, Japan—Hokkaido.

46-1379
Measurements of an atmospheric boundary layer around the air-sea-ice observation tower: 1990 winter experiments.
Shirasawa, K., et al, *Low temperature science (Teion kagaku). Series A Physical sciences*, 1990, No.49, p.25-36, In Japanese with English summary. 12 refs.
Aota, M., Takatsuka, T.
Air ice water interaction, Drift, Boundary layer, Wind factors, Towers, Weather stations.

46-1380
Measurements in the boundary layer under landfast ice in southeast Hudson Bay. III. Observations of turbulence intensity, momentum, heat and salt fluxes.
Shirasawa, K., et al, *Low temperature science (Teion kagaku). Series A Physical sciences*, 1990, No.49, p.37-51, In Japanese with English summary. 10 refs.
Ingram, R.G., Takatsuka, T.
Fast ice, Ice water interface, Turbulent boundary layer, Ice bottom surface, Canada—Hudson Bay.

46-1381
Experimental studies on freezing and frost heaving of saline soils.
Yagi, T., et al, *Low temperature science (Teion kagaku). Series A Physical sciences*, 1990, No.49, p.53-64, In Japanese with English summary. 10 refs.
Fukuda, M., Ishizaki, T.
Saline soils, Soil freezing, Frost heave.

46-1382
Relationship between soil particle distribution obtained by scanning electron microscope and frost susceptibility.
Ishizaki, T., et al, *Low temperature science (Teion kagaku). Series A Physical sciences*, 1990, No.49, p.65-73, In Japanese with English summary. 9 refs.
Fukuda, M., Jia, W.Y.
Soil freezing, Frost resistance, Particle size distribution, Scanning electron microscopy.

46-1383
Deformation of polycrystalline ice and effect of hydrostatic pressure on the creep rate at temperatures close to the pressure melting point.
Mizuno, Y., *Low temperature science (Teion kagaku). Series A Physical sciences*, 1990, No.49, p.75-80, In Japanese. 10 refs.
Ice deformation, Ice creep, Ice crystals, Ice pressure, Melting points.

46-1384
Research under frozen seas.
Cowan-Smith, V., *Sea frontiers*, Mar.-Apr. 1988, 34(2), p.88-93, 6 refs.
Submarines, Oceanography, Sea ice, Subglacial navigation, Ice navigation, Safety, Subglacial observations, Arctic Ocean.

46-1385
First Latin American Conference on Antarctic Geophysics, Geodesy and Space Research, Buenos Aires, July 30-Aug. 3, 1990. Proceedings. [Actas de la Primera Conferencia Latinoamericano sobre Geofisica, Geodesia e Investigacion Espacial Antarticas, Buenos Aires, 30 de julio al 3 de agosto de 1990],
Louro, A., ed, [Buenos Aires, Centro Latinoamericano de Fisica, 1990], 350p., In Spanish. Refs. passim.
For individual papers see 19A-44909, A-45129, C-45118, C-45124, C-45145, E-45113 through E-45115, E-45117, F-45122, H-45130, I-45125 through I-45128, I-45131, I-45134, I-45146, J-45121, K-45132, K-45133, K-45135 through K-45142, K-45144, L-45116, L-45119, L-45120, L-45123, L-45143 or 46-1386 through 46-1391.
Van Zele, M.A., ed, Velasco, I., ed.
Low temperature research, Geophysical surveys, Geodesy, Polar regions.
This is a collection of papers presented at the 1st Latin American Conference on Antarctic Geophysics, Geodesy and Space Research, reporting results of studies conducted in Antarctica by Latin American scientists and guests from other nations. The sponsors of the Conference include the American Geophysical Union. The papers are representative of the wide variety of interests related to the principal subject of the Conference, such as paleoclimatology, geography, geology, oceanography, satellite information, global climatic changes, sea ice, and atmospheric pollution.

46-1386
Antarctic lakes a source of paleoglacial information.
Bardin, V.I., Actas de la Primera Conferencia Latinoamericana sobre Geofisica, Geodesia e Investigación Espacial Antárticas. (First Latin American Conference on Antarctic Geophysics, Geodesy and Space Research, Buenos Aires, July 30-Aug. 3, 1990. Proceedings.) Edited by A. Louro, M.A. Van Zele, and I. Velasco, [Buenos Aires, Centro Latinoamericano de Fisica, 1990], p.3-7, 14 refs.
Lacustrine deposits, Glaciation, Limnology, Paleoclimatology.
Studies carried out principally in the lakes of Victoria Land, Queen Maud Land and the Prince Charles Mountains, are briefly reviewed. The importance of information obtained from the lake sediments, in determining the paleogeographic and paleoglacial conditions of the lake's development, is emphasized. It is concluded that since the present antarctic basins throw light only on the very last stages of antarctic glaciation, it is very important to examine ancient lake sediments and ice to understand the migration of basins caused by changes in glacial, geomorphological and climatic conditions.

46-1387
Geophysical study in the northern sector of the Antarctic Peninsula and the Larsen Ice Shelf. [Estudio geofisico en el sector norte de la peninsula antártica y barrera de hielos Larsen],
Keller, M., et al, Actas de la Primera Conferencia Latinoamericana sobre Geofisica, Geodesia e Investigación Espacial Antárticas. (First Latin American Conference on Antarctic Geophysics, Geodesy and Space Research, Buenos Aires, July 30-Aug. 3, 1990. Proceedings.) Edited by A. Louro, M.A. Van Zele, and I. Velasco, [Buenos Aires, Centro Latinoamericano de Fisica, 1990], p.81-90, In Spanish. 9 refs.
Diaz, M.T., Skvarca, P.
Gravity anomalies, Ice shelves, Bottom topography, Seismic surveys, Antarctica—Antarctic Peninsula, Antarctica—Larsen Ice Shelf.
The sea bottom topography and the thickness of the Larsen Ice Shelf were determined on the basis of seismic records and gravimetric data obtained from gravity bases tied to existing intercontinental networks through South America and the Antarctic Peninsula. The gravimetric ties among stations are described, and the seismic and gravimetric profiles are discussed and illustrated. A 4-layer model, constructed on the basis of the Bouguer anomaly observed and the thickness of ice obtained by seismic refraction, shows a fairly regular sea bottom topography which increases in depth toward the Jason Peninsula, 700 m as the average thickness of marine sediments, and a water layer of less than 200 m.

46-1388
Doppler positioning on the Antarctic Peninsula. [Posicionamiento satelital Doppler en la peninsula Antartica].
Skvarca, P., et al. Actas de la Primera Conferencia Latinoamericana sobre Geofísica, Geodesia e Investigación Espacial Antárticas. (First Latin American Conference on Antarctic Geophysics, Geodesy and Space Research, Buenos Aires, July 30-Aug. 3, 1990. Proceedings.) Edited by A. Louro, M.A. Van Zele, and I. Velasco, [Buenos Aires, Centro Latinoamericano de Física, 1990], p.99-108, In Spanish. 10 refs.
Soto, J.R., Keller, M.A., Diaz, M.T.
Mapping, Data processing, Geodetic surveys, Spaceborne photography, Antarctica—Antarctic Peninsula.
In Oct. and Nov. of 1988, the Instituto Antártico Argentino and the Servicio de Hidrografía Naval jointly carried out the project of Doppler positioning on the Antarctic Peninsula. The satellite receivers and the data processing method used are described. The results are discussed and presented in tables and charts, showing precise values of absolute gravity acceleration and the mean sea level at various Argentine antarctic coastal stations.

46-1389
Role of the polar regions in global change.
Weller, G., Actas de la Primera Conferencia Latinoamericana sobre Geofísica, Geodesia e Investigación Espacial Antárticas. (First Latin American Conference on Antarctic Geophysics, Geodesy and Space Research, Buenos Aires, July 30-Aug. 3, 1990. Proceedings.) Edited by A. Louro, M.A. Van Zele, and I. Velasco, [Buenos Aires, Centro Latinoamericano de Física, 1990], p.114-129, 27 refs.
Air ice water interaction, Climatic changes, Paleoclimatology, Sea ice, Polar regions.
The processes of interaction between the air, snow, and ice, land and ocean at high latitudes, and the feedback processes associated with these interactions, make the polar regions key areas of critical influence on global climate change. The polar regions are also repositories of data on past climates and atmospheric composition. It is suggested that a uniform warming of the polar regions, as predicted by the models, has not been observed so far. The observed changes vary greatly from region to region, with some regions showing warming and others cooling. The powerful feedback processes, as well as climatic changes which in turn affect the polar snow, ice and permafrost are discussed and illustrated.

46-1390
Sea ice influence on the development of a cyclone in Antarctica. [Influencia del hielo marino en el desarrollo de un ciclón en la Antártida].
Menéndez, C., et al. Actas de la Primera Conferencia Latinoamericana sobre Geofísica, Geodesia e Investigación Espacial Antárticas. (First Latin American Conference on Antarctic Geophysics, Geodesy and Space Research, Buenos Aires, July 30-Aug. 3, 1990. Proceedings.) Edited by A. Louro, M.A. Van Zele, and I. Velasco, [Buenos Aires, Centro Latinoamericano de Física, 1990], p.169-178, In Spanish. 9 refs.
Orlanski, I.
Sea ice distribution, Air ice water interaction, Atmospheric disturbances, Marine meteorology, South Pacific Ocean.
Various numerical experiments, conducted to study the effects of the extent of sea ice on antarctic climate, are described. Preliminary results with a description of models used in the experimentation are given on the influence of sea ice cover around Antarctica on the development of an explosive cyclogenesis which occurred on Sep. 5, 1987, in the South Pacific Ocean. The lowest pressure at sea level during the storm reached 950 hPa. It is concluded that neither the ice surface roughness nor the surface heat flow contribute significantly to the intensification of subantarctic cyclones.

46-1391
Antarctic climate manifestations from observations on South Orkney Is. [Indicaciones del clima antártico a partir de observaciones realizadas en las islas Orcadas].
Ereño, C.E., et al. Actas de la Primera Conferencia Latinoamericana sobre Geofísica, Geodesia e Investigación Espacial Antárticas. (First Latin American Conference on Antarctic Geophysics, Geodesy and Space Research, Buenos Aires, July 30-Aug. 3, 1990. Proceedings.) Edited by A. Louro, M.A. Van Zele, and I. Velasco, [Buenos Aires, Centro Latinoamericano de Física, 1990], p.196-206, In Spanish. 9 refs.
Tarallo, L.I.
Ice air interface, Sea ice distribution, Ice volume, Ice edge, Climatic factors, Antarctica—South Orkney Islands.
Major findings reported include the following: that the mean annual temperature of the South Orkneys is a good climatic indicator of the annual ice conditions in the Weddell Sea, although not for those in the Bellingshausen Sea; the seasonal temperature averages are generally not good indicators of areas covered by sea ice; that the good correlations observed between the mean annual temperature at South Orkneys and the mean annual ice edge latitude justifies the use of these parameters as indicators of antarctic climate; and that the temperature records, the freezing and thawing dates, and the number of days in which the Scotia Bay remained blocked by ice show a trend of increasing temperature, and decreasing ice formation, particularly in the last 20 years.

46-1392
Frequency of debris flows and slush avalanches in Spitsbergen: a tentative evaluation from lichenometry.
André, M.F., *Polish polar research*, 1990, 11(3-4), p.345-363, With Polish summary. 36 refs.
Geomorphology, Lichens, Avalanches, Slush, Avalanche deposits, Norway—Spitsbergen.

46-1393
Geodynamic aspects of studies of Quaternary inland sediments in South Spitsbergen (attempt to synthesis).
Lindner, L., et al. *Polish polar research*, 1990, 11(3-4), p.365-387, With Polish summary. Refs. p.381-386.
Marks, L.
Pleistocene, Quaternary deposits, Mapping, Geological surveys, Landforms, Glacial deposits, Lacustrine deposits, Rock glaciers, Talus, Beaches, Norway—Spitsbergen.

46-1394
***Quaternary* landforms and sediments, and morphogenetic evolution of Treskelen-Hyrnefjellet-Kruseryggen area, Wedel Jarlsberg Land, Spitsbergen.**
Lindner, L., et al. *Polish polar research*, 1990, 11(3-4), p.389-400, With Polish summary. 30 refs.
Marks, L., Szczesny, R.
Quaternary deposits, Landforms, Geomorphology, Mapping, Geological maps, Norway—Spitsbergen.

46-1395
Heavy metals in tundra plants of Bellsund area, Spitsbergen.
Jóźwik, Z., *Polish polar research*, 1990, 11(3-4), p.401-409, With Polish summary. 14 refs.
Metals, Tundra, *Plants (botany)*, *Plant physiology*, Mosses, Lichens, Norway—Spitsbergen.

46-1396
Polish geodetic and cartographic studies in the arctic and antarctic regions.
Cisak, J., et al. *Polish polar research*, 1990, 11(3-4), p.411-417, 7 refs.
Dabrowski, S.
Geodetic surveys, Photogrammetry, Low temperature research, Polar regions, Antarctica—Arctowski Station.
Permanent renewal of measurements of phenomena occurring on the Earth surface - the main task of geodesy and cartography - is the important element of geodynamic studies of the arctic and antarctic regions. The Institute of Geodesy and Cartography has participated in the program of research led by the Polish Academy of Sciences for over 10 years, using conventional geodetic methods, as well as new types of data acquired from satellite observations and through remote sensing techniques. This activity is evidenced by setting up astronomical main points close to Hornsund Station in 1958, as well as at Arctowski Station in 1976, where cyclic astronomical and satellite measurements were performed. A geodynamic test site was organized in the Hornsund Region. As a result of these works numerous topographic and thematic maps were produced and many scientific publications were prepared by Institute specialists. (Auth.)

46-1397
Evidence from antarctic ice cores for recent increases in snow accumulation.
Morgan, V.I., et al. *Nature*, Nov. 1991, 354(6348), p.58-60, 21 refs.
Goodwin, I.D., Etheridge, D.M., Wookey, C.W.
Ice cores, Snow accumulation, Ice cover thickness.
Present ice sheet estimates indicate that both the outflow and the net accumulation are approximately equal to 2,000 cu km of ice per year (equivalent to about 6 mm of sea level). The temporal variation of accumulation rate is central to determinations of the mass budget, because accumulation can change rapidly in response to short-term climate variations, whereas ice flow varies only on longer time scales. Here time series are presented showing changes in the net rate of snow accumulation since 1806 along a 700 km segment of East Antarctica. The accumulation record was derived from the thicknesses of annual layers in ice cores, deduced from seasonal variations in oxygen isotope ratio and in ice-crust stratigraphy. A significant increase in the accumulation rate occurs following a minimum around 1960, leading to recent rates that are about 20% above the long-term mean. If this recent increase is widespread, as suggested by shorter-term accumulation data from across a large part of Antarctica, the positive imbalance (5-25% of the mass input) shown in recent studies of the ice sheet mass budget may have existed only since the late 1960s. It is estimated that this increase in accumulation rate should contribute to a lowering of sea level of 1.0-1.2 mm per year. (Auth.)

46-1398
Ocean circulation beneath the Ronne ice shelf.
Nicholls, K.W., et al. *Nature*, Nov. 21, 1991, 354(6350), p.221-223, 16 refs.
Makinson, K., Robinson, A.V.
Ocean currents, Ice shelves.
Water modified by passage under ice shelves, particularly in the Weddell Sea, is believed to be an important constituent of Antarctic Bottom Water. Antarctic Bottom Water is both cold and oxygen-rich, and plays an important part in the cooling and ventilation of the world's oceans. Because of the difficulty in gaining access, the oceanographic regime beneath ice shelves is very poorly sampled. By successfully drilling through the ice however, oceanographic data were obtained from beneath the largest antarctic ice shelf, the Ronne-Filchner ice shelf in the southern Weddell Sea. The authors' data agree well with the predictions of a relatively simple oceanographic plume model of sub-ice shelf circulation. This model can therefore be used with some confidence to investigate the links among climate changes, ice-shelf melting and bottom-water production. (Auth. mod.)

46-1399
Monitoring the water content of snow, soils, and glaciers by natural penetrating radiation. [Monitoring vlagozapasov v snege, pochvakh, lednikakh po estestvennym pronikaiushchim izlucheniiam].
Fridman, Sh.D., et al. Leningrad, Gidrometeoizdat, 1990, 263p., In Russian. 190 refs.
Monitors, Snow water content, Soil water, Glaciers, Ice (water storage), Gamma irradiation, Snow cover, Remote sensing, *Analysis (mathematics)*

46-1400
Mathematical models for forecasting runoff. [Matematicheskie modeli v prognozakh rechnogo stoka].
Koren', V.I., Leningrad, Gidrometeoizdat, 1991, 198p., In Russian. 177 refs.
Mathematical models, Runoff forecasting, Simulation, Snowmelt, Snow water content, Soil freezing.

46-1401
Areal pattern of burned tree vegetation in the subarctic region of northwestern Canada.
Timoney, K.P., et al. *Arctic*, Sep. 1991, 44(3), p.223-230, With French summary. 41 refs.
Wein, R.W.
Forest tundra, Forest fires, Canada—Northwest Territories.

46-1402
Experimental investigations of the microstructure of agglomerate of ice and methane hydrate.
Ershov, E.D., et al. *Soviet engineering geology*, 1990, No.3, p.32-37, 8 refs. For Russian original see 44-4542.
Lebedenko, IU.P., Chuvilin, E.M., IAkushev, V.S.
Natural gas, Hydrates, Frozen rocks, Ice formation, Geocryology, Hydrocarbons, Microstructure.

46-1403
Use of magnetic and gravimetric methods in studying underground ice.
Matveev, V.S., et al. *Soviet engineering geology*, 1990, No.3, p.73-77, 9 refs. For Russian original see 44-4543.
Kritsuk, L.N., Baskakova, I.N.
Ground ice, Geocryology, Distribution, Geophysical surveys, Exploration, Electromagnetic prospecting, Accuracy, Engineering geology, Gravity.

46-1404
Temperature deformations of freezing and frozen soils under various thermal and mechanical actions.
Ershov, E.D., et al. *Soviet engineering geology*, 1990, No.5, p.6-12, Translated from Inzhenernaia geologiia, 1990, No.5. 3 refs.
Frozen ground mechanics, Frozen ground temperature, Temperature variations, Temperature effects, Deformation, Geocryology, Soil tests.

46-1405
Migratory thermal stability of phase front with freezing of soils.
Bronfenbrener, L.E., *Soviet engineering geology*, 1990, No.5, p.28-34, Translated from Inzhenernaia geologiia, 1990, No.5. 10 refs.
Soil freezing, Phase transformations, Freezing front, Stability, Ice lenses, Geocryology, Mathematical models, Frost heave.

46-1406
Deformation of peat deposit with change in conditions of the bog's water feed.
Dimov, L.A., *Soviet engineering geology*, 1990, No.5, p.35-37, Translated from Inzhenernaia geologiia, 1990, No.5. 2 refs.
Peat, Water content, Deformation, Soil freezing, Snow cover effect, Swamps, *Ground water*

46-1407
Changes in geological environment of cryolithozone as a result of economic development.
Chizhov, A.B., et al. *Soviet engineering geology*, 1990, No.5, p.67-72. Translated from Inzhenernaia geologiia, 1990, No.5. 4 refs.
Van'ko, IU.V., Dereviagin, A.IU.
Geocryology, Frozen ground, Cold weather construction, Economic development, Environmental impact, Engineering geology.

46-1408
Evaluation of the possibility of reducing the duration of compression tests of frozen soils.
Mirenburg, IU.S., et al. *Soviet engineering geology*, 1990, No.5, p.97-101. Translated from Inzhenernaia geologiia, 1990, No.5. 3 refs.
Kondakova, O.A., Pavlichenko, S.A., Yablonskaia, L.D.
Frozen ground mechanics, Soil tests, Compressive properties, Laboratory techniques, Loading, Engineering geology, Design, Deformation.

46-1409
Results of study of thermal properties of peats in northern regions of Tyumen Oblast.
Damshan, IU.S., et al. *Soviet engineering geology*, 1990, No.4, p.25-27. Translated from Inzhenernaia geologiia, 1990, No.4. 5 refs.
Zaitsev, V.S.
Peat, Thermal properties, Soil analysis, Soil temperature, Temperature effects, Frozen ground thermodynamics, Geocryology, Engineering geology.

46-1410
Navy NOAA Joint Ice Center's role in the climate and global change program.
Kniskern, F.E., *Global and planetary change*, July 1991, 4(1-3), Conference on Operational Satellites, Washington, D.C., Oct. 16-19, 1990. Proceedings. Sentinels for the monitoring of climate and global change. Edited by G. Ohring et al, p.207-212.
Sea ice distribution, Ice conditions, Ice surveys, Research projects, Climatic changes, Global change, Remote sensing, Ice forecasting, Data processing.

46-1411
NOAA satellite snow cover data.
Matson, M., *Global and planetary change*, July 1991, 4(1-3), Conference on Operational Satellites, Washington, D.C., Oct. 16-19, 1990. Proceedings. Sentinels for the monitoring of climate and global change. Edited by G. Ohring et al, p.213-218, 2 refs.
Snow cover distribution, Spaceborne photography, Sensor mapping, Global change, Climatology, Data processing.

46-1412
Operational satellites and the global monitoring of snow and ice.
Walsh, J.E., *Global and planetary change*, July 1991, 4(1-3), Conference on Operational Satellites, Washington, D.C., Oct. 16-19, 1990. Proceedings. Sentinels for the monitoring of climate and global change. Edited by G. Ohring et al, p.219-224, 16 refs.
Spaceborne photography, Snow cover distribution, Sea ice distribution, Global warming, Global change, Forecasting, Albedo, Climatology, Radiometry.

46-1413
Real-time climate monitoring of global snow cover.
Ropelewski, C.F., *Global and planetary change*, July 1991, 4(1-3), Conference on Operational Satellites, Washington, D.C., Oct. 16-19, 1990. Proceedings. Sentinels for the monitoring of climate and global change. Edited by G. Ohring et al, p.225-229, 6 refs.
Snow cover distribution, Spaceborne photography, Sensor mapping, Climatic changes, Periodic variations, Global change, Climatology.

46-1414
Cryospheric products from the DMSP-SSM/I: status and research applications.
Barry, R.G., *Global and planetary change*, July 1991, 4(1-3), Conference on Operational Satellites, Washington, D.C., Oct. 16-19, 1990. Proceedings. Sentinels for the monitoring of climate and global change. Edited by G. Ohring et al, p.231-234, 16 refs.
Spaceborne photography, Radiometry, Sea ice distribution, Ice conditions, Climatic changes, Global change

46-1415
Merging operational satellite and historical station snow cover data to monitor climate change.
Robinson, D.A., *Global and planetary change*, July 1991, 4(1-3), Conference on Operational Satellites, Washington, D.C., Oct. 16-19, 1990. Proceedings. Sentinels for the monitoring of climate and global change. Edited by G. Ohring et al, p.235-240, 12 refs.
Snow cover distribution, Spaceborne photography, Snow surveys, Climatic changes, Climatic factors, Correlation, Meteorological data.

46-1416
Abrasion of concrete by ice in arctic sea structures.
Huovinen, S., *Rakenteiden mekaniikka*, 1990, 23(1), p.23-24, 2 refs. For other versions see 44-3340 and 44-3770.
Offshore structures, Concrete structures, Damage, Abrasion, Sea ice, Ice solid interface, Forecasting, Countermeasures, Mechanical tests.

46-1417
Carbon balance in tussock tundra under ambient and elevated atmospheric CO2.
Grulke, N.E., et al, *Oecologia*, 1990, 83(4), p.485-494, 36 refs.
Tundra, Carbon dioxide, Atmospheric composition, Global warming, Ecosystems, Environmental impact, Vegetation patterns, Climatic changes, Plant ecology.

46-1418
Cosmic spherules in the geologic record.
Taylor, S., et al, *Meteoritics*, 1991, Vol.26, MP 2977, p.203-211, 28 refs.
Brownlee, D.E.
Cosmic dust, Classifications, Geological surveys, Age determination, Weathering, Chemical composition, Ice surveys, Spheres, Time factor.

46-1419
Experimental frost and salt weathering of chalk—1.
Jerwood, L.C., et al, *Earth surface processes and landforms*, Nov. 1990, 15(7), p.611-624, 50 refs.
Robinson, D.A., Williams, R.B.G.
Frozen rock strength, Frost weathering, Frost action, Salt water, Freeze thaw tests, Solutions, Damage, Salt, Temperature effects.

46-1420
Topography and ice sheet growth.
Payne, A., et al, *Earth surface processes and landforms*, Nov. 1990, 15(7), p.625-639, 17 refs.
Sugden, D.E.
Ice sheets, Glacier mass balance, Ice models, Topographic effects, Ice growth, Glaciation, Air temperature, Ice age theory, Mathematical models, United Kingdom—Scotland.

46-1421
Differential weathering of feldspar and pyroxene in an arctic-alpine environment.
McCarroll, D., *Earth surface processes and landforms*, Nov. 1990, 15(7), p.641-651, 52 refs.
Arctic landscapes, Bedrock, Weathering, Minerals, Rock properties, Lithology, Subsurface investigations, Surface roughness, Lichens.

46-1422
Temperature correction of electrical conductivity values.
Calles, B., et al, *Earth surface processes and landforms*, Nov. 1990, 15(7), p.673-678, 15 refs.
Calles, U.M.
Streams, Snowmelt, Sampling, Electrical measurement, Electrical resistivity, Accuracy, Water temperature, Solutions, Water chemistry.

46-1423
Absorption coefficient of the liquid N2 2.15 micron band and application to Triton.
Grundy, W.M., et al, *Icarus*, Sep. 1991, 93(1), p.169-173, 38 refs.
Fink, U.
Satellites (natural), Cryogenics, Extraterrestrial ice, Liquefied gases, Radiation absorption, Remote sensing, Simulation, Triton, Scattering, Grain size.

46-1424
Experimental study of directional solidification of aqueous ammonium chloride solution.
Chen, C.F., et al, *Journal of fluid mechanics*, June 1991, Vol.227, p.567-586, 28 refs.
Chen, F.
Solutions, Solidification, Liquid cooling, Convection, Phase transformations, Porosity, Temperature effects, Fluid mechanics, Solid phases.

46-1425
Isotope and impurity effects on the glass transition and crystallization of pressure-amorphized hexagonal and cubic ice.
Johari, G.P., et al, *Journal of chemical physics*, Nov. 1, 1991, 95(9), p.6849-6855, 35 refs.
Hallbrucker, A., Mayer, E.
Ice physics, High pressure ice, Amorphous ice, Doped ice, Phase transformations, Molecular structure, Temperature measurement, Low temperature research, Ice relaxation.

46-1426
Longitudinal-optic-transverse-optic mode splitting in ice Ih.
Klug, D.D., et al, *Journal of chemical physics*, Nov. 1, 1991, 95(9), p.7011-7012, 15 refs.
Tse, J.S., Whalley, E.
High pressure ice, Radiation absorption, Spectra, Infrared radiation, Ice optics, Molecular structure, Ice physics, Vibrations.

46-1427
U.S. Coast Guard surface ice reports 1970-1990.
U.S. Coast Guard, 1990, n.p., Microfilm from U.S. Coast Guard Ice Navigation Center, Cleveland, OH.
Ice conditions, Ice reporting, Lake ice, Ice navigation, Great Lakes.

46-1428
Great Lakes ice charts 1973-1991.
U.S. National Weather Service, Ann Arbor, MI, 1991, n.p., Microfilm from World Data Center A for Glaciology, Boulder, Colorado.
Ice conditions, Ice reporting, Lake ice, Ice cover, Meteorological charts, Great Lakes.

46-1429
U.S. Coast Guard vessel observations and operations reports 1990-1991.
U.S. Coast Guard, 1991, n.p.
Ice conditions, Ice reporting, Lake ice, River ice, Ice navigation, Great Lakes.

46-1430
High-frequency paleovariability in climate and CO2 levels from Vostok ice core records.
Yiou, P., et al, *Journal of geophysical research*, Nov. 10, 1991, 96(B12), p.20,365-20,378, Refs. p.20,377-20,378.
Ice cores, Chemical analysis, Meteorological data, Paleoclimatology, Antarctica—Vostok Station.
The high resolution of the Vostok records provides a unique look at the causes of paleoclimatic variability during the last complete glacial cycle. The records present strong evidence for the interaction between orbital forcing and internal physicochemical mechanisms of variability. This interaction appears to account for the great width of spectral features found in the records. (Auth.)

46-1431
Reduced antarctic ozone depletions in a model with hydrocarbon injections.
Cicerone, R.J., et al, *Science*, Nov. 22, 1991, 254(5035), p.1191-1194, Numerous refs.
Elliott, S., Turco, R.P.
Atmospheric composition, Ozone, Stratosphere, Clouds (meteorology).
A concept is suggested for action to arrest ozone loss over Antarctica by injecting the alkanes ethane or propane (E or P) into the antarctic stratosphere. A numerical model of chemical processes was used to explore the concept. The model results suggest that annual injections of about 50,000 tons of E or P could suppress ozone loss, but there are some scenarios where smaller E or P injections could increase ozone depletion. Further, key uncertainties must be resolved, including initial concentrations of nitrogen-oxide species in austral spring, and several poorly defined physical and chemical processes must be quantified. There would also be major difficulties in delivering and distributing the needed alkanes. (Auth. mod.)

46-1432
Greenhouse impact in Fennoscandia—preliminary findings of a European workshop on the effects of climatic change.
Boer, M.M., et al, *Ambio*, Feb. 1990, 19(1), p.2-10, 28 refs.
Koster, E.A., Lundberg, H.
Climatic changes, Atmospheric composition, Carbon dioxide, Environmental impact, Air temperature, Fennoscandia.

46-1433
Ice on Lake Ontario at Kingston.
Gilbert, R., *Journal of great lakes research*, 1991, 17(3), p.403-411, 19 refs.
Lake ice, Ice growth, Ice cover thickness, Freezeup, Ice breakup, Climatic factors, Ice surveys, Periodic variations, Air temperature, Canada—Ontario, Lake.

46-1434
Electric thawing of permafrost foundation beds using horizontal current-conducting layers (HCL).
Gamilovskii, V.K., *Soil mechanics and foundation engineering*, July 1991, 28(1), p.18-23, Translated from Osnovaniia, fundamenty i mekhanika gruntov, 1991, No.1. 6 refs.
Permafrost beneath structures, Ground thawing, Artificial thawing, Electric heating, Design, Layers, Electrical resistivity, Cold weather construction.

46-1435
Soil formation in alases.
Desiatkin, R.V., *Soviet soil science*, Oct. 1991, 23(4), p.9-19, Translated from Pochvovedenie, 1990, No.12. 33 refs.
Thermokarst development, Alassy, Geocryology, Soil formation, Climatic factors, Soil classification.

46-1436
Mathematical model of frost resistance of winter wheat.
Shvytov, I.A., et al, *Soviet agricultural sciences*, 1991, No.1, p.4-6, Translated from Doklady Vsesoiuznoi akademii sel'skokhoziaistvennykh nauk, 1991, No.1. 5 refs.
Barashkova, E.A.
Plants (botany), Cold weather survival, Frost resistance, Soil temperature, Mathematical models, Agriculture, Temperature effects.

46-1437
Planning site engineering in the cryolithozone according to results of preliminary investigations.
Khrustalev, L.N., et al, *Soviet engineering geology*, 1990, No.2, p.80-86, 4 refs. For Russian original see 44-4537.
Kozlov, A.N.
Engineering geology, Site surveys, Geocryology, Design criteria, Cost analysis.

46-1438
Problems of development of the cryolithozone and cryopedology at the modern stage.
Ershov, E.D., *Soviet engineering geology*, 1991, No.1, p.11-17, Translated from Inzhenernaia geologiia, 1991, No.1.
Geocryology, Cold weather construction, Environmental impact, Ecology, Research projects, Engineering geology.

46-1439
Thermal gradient of Callisto constrained by Asgard Basin: rheological and chemical implications.
Allemand, P., et al, *Journal of geophysical research*, Nov. 25, 1991, 96(E4), p.20,981-20,988, 31 refs.
Thomas, P.G.
Satellites (natural), Extraterrestrial ice, Geologic processes, Ground ice, Rheology, Thermal regime, Lithology, Surface temperature, Geocryology.

46-1440
Abstracts.
International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, 355p., In Japanese and English. Refs. passim. For selected papers see 46-1441 through 46-1480.
Sea ice, Ice water interface, Ice loads, Ice cover strength, Ice solid interface, Algae, Ocean waves, Offshore structures, Drift.

46-1441
Contemporary trends and cooperative research on sea ice-covered waters.
Alexander, V., International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.1-4.
Sea ice, Research projects, International cooperation.

46-1442
Fresh water supply to the Sea of Okhotsk and volume transport of Soya warm current.
Aota, M., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.13-16, In Japanese with English summary. 13 refs.
Ishikawa, M.
Water transport, Ocean currents, Sea ice, Sea water freezing, Sea water, Salinity, Okhotsk Sea.

46-1443
Sea ice response to an increase of the surface layer salinity.
Hudier, E., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.24-32, 15 refs.
Ingram, R.G.
Ice water interface, Ice bottom surface, Sea ice, Ice melting, Salinity.

46-1444
Measurements of turbulence intensity, momentum, heat and salt fluxes in the boundary layer under land-fast ice in southeast Hudson Bay.
Shirasawa, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.33-39, 2 refs.
Ingram, R.G., Takatsuka, T.
Fast ice, Ice bottom surface, Ice water interface, Turbulent boundary layer, Salinity, Canada—Hudson Bay.

46-1445
Global significance of ice algal production.
Legendre, L., International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.62-65, 30 refs.
Algae, Biomass, Cryobiology, Sea ice, Marine biology.

46-1446
Ice algal assemblages from lagoons Saroma-ko, Notoro-ko and Akkeshi-ko in Hokkaido.
Watanabe, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.75-79, In Japanese with English summary.
Algae, Cryobiology, Sea ice, Marine biology, Japan—Hokkaido.

46-1447
Microbial assemblages in antarctic sea ice: a comparison of the pack and land-fast ice habitats.
Garrison, D.L., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.80-88, 55 refs.
Watanabe, K.
Algae, Cryobiology, Ecology, Marine biology, Microbiology, Pack ice, Fast ice, Biomass, Antarctica.
The ice surrounding Antarctica is an extensive, highly seasonal habitat. Assemblages comprised of algae, heterotrophic protozoans and metazoans inhabit much of the sea ice. The high concentration of organisms associated with ice has suggested *that this may be an important site of production in polar oceans.* Until the late 1970s studies were concentrated in the nearshore, land-fast ice, and most studies were during the summer months. In the last decade, however, there have been a number of studies in the pack ice regions and observations have included the winter months. It is now apparent that there are several distinct habitats in antarctic sea ice. Organisms may occupy the surface, the interior, or the bottom layers of ice floes. The distribution of the ice biota varies throughout the ice covered regions. Although there are exceptions, it is generally reported that surface-layer and interior assemblages are most common in drifting pack ice, whereas bottom-layer assemblages characterize the land-fast ice. Differences in the environmental regimes of the nearshore and offshore regions appear to explain the major features of the distributions. Ice-associated assemblages vary in their characteristic biomass concentrations and apparently in their population dynamics. The ice-associated algae have been extensively studied. (Auth.)

46-1448
Ice-active substance from antarctic sea ice diatoms.
Raymond, J.A., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.89-92, 11 refs.
Sullivan, C.W., DeVries, A.L.
Algae, Cryobiology, Ecology, Marine biology, Sea ice, Ice crystal growth.
Microalgae found in the sea-ice layer contribute significantly to the productivity of the polar oceans. The ice layer, with its many ice platelets, channels and pockets, provides numerous habitats in which microbial communities can become established. Diatoms, the main constituents of the microalgae, exist both attached to the ice and in close association with the ice. Ice diatoms excrete a number of low molecular weight metabolites as well as high molecular weight polysaccharide mucilages of varying solubility. Among attached diatoms, the mucilages act as adhesives, but they may have other roles as well. Recent preliminary work has shown that sea-ice diatoms in McMurdo Sound excrete a novel high molecular weight water-soluble substance that has a profound effect on the growth of ice in the platelet layer. The substance appears to adsorb to growing ice and causes dense pitting on the platelet surfaces. The radical alteration of ice crystal surfaces by this substance suggests that it may play a role in the sea ice community where ice surfaces are the principal substrate. (Auth. mod.)

46-1449
Characteristics of suspended solids in sea and lake ice.
Tachibana, H., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.102-106, In Japanese with English summary. 1 ref.
Suspended sediments, Water pollution, Impurities, Sea ice, Lake ice, Japan—Hokkaido.

46-1450
Ice-structure interaction during indentation tests.
Nakazawa, N., et al, MP 2978, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.107-111, 3 refs.
Sodhi, D.S.
Ice cover strength, Ice loads, Ice solid interface, Ice pressure, Impact tests, Penetration tests, Ice breaking.

46-1451
Ice forces on conical structures due to change in water level.
Enoki, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.112-116, In Japanese with English summary. 6 refs.
Terashima, T., Yamazaki, K., Nakazawa, N., Saeki, H.
Ice loads, Ice pressure, Ice solid interface, Ice cover strength, Water level, Offshore structures, Analysis (mathematics).

46-1452
Effect of bottom roughness on the mechanical strength of ice floe.
Takeuchi, T., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.117-121, In Japanese with English summary. 17 refs.
Shapiro, L.H.
Ice loads, Ice cover strength, Ice cover thickness, Ice bottom surface, Ice pressure, Surface roughness.

46-1453
In-situ measurement of the fracture toughness of sea ice; a progress report.
Shapiro, L.H., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.122-125, 10 refs.
Takeuchi, T.
Ice cover strength, Ice loads, Sea ice, Ice cracks, Strain tests.

46-1454
Triaxial strength of laboratory grown saline ice.
Kato, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.126-130, In Japanese with English summary. 2 refs.
Kishimoto, H., Mita, S.
Ice cover strength, Ice loads, Salt ice, Ice pressure, Strain tests.

46-1455
Experimental study on the damping of wave height due to the ice floes.
Ueda, T., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.131-135, In Japanese with English summary. 1 ref.
Hattori, T., Yamashita, T., Saeki, H., Enoki, K.
Ice cover effect, Ocean waves, Damping, Attenuation.

46-1456
Study on wave hindcasting in consideration of sea ice.
Mizuno, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.136-140, In Japanese with English summary. 4 refs.
Sugimoto, Y., Hirasawa, M., Tokikawa, K.
Ice cover effect, Ocean waves, Ice control.

46-1457
Experimental studies on adfreeze bond strength and coefficient of friction between sea ice and various materials.
Nakazawa, N., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.141-145, 3 refs.
Ice cover strength, Ice adhesion, Ice friction, Ice solid interface, Offshore structures, Ice loads.

46-1458
Estimation methods for abrasion amount of concrete offshore structures due to the movement of sea ice sheet.
Itoh, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.146-151, In Japanese with English summary. 8 refs.
Asai, Y., Oritani, N., Saeki, H.
Ice friction, Ice solid interface, Abrasion, Offshore structures, Concrete structures, Ice loads.

46-1459
Characteristics of high-strength light weight concrete for icy waters.
Asai, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.152-156, In Japanese with English summary. 3 refs.
Itoh, Y., Saeki, H., Kanie, S.
Concrete durability, Concrete freezing, Ice loads, Frost resistance, Offshore structures, Ice solid interface, Lightweight concretes.

46-1460
Development of high strength lightweight concrete for icy waters—pumpable lightweight concrete.
Asai, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.157-161, In Japanese with English summary. 1 ref.
Itoh, Y., Akisato, N., Ikejiri, K.
Lightweight concretes, Concrete freezing, Frost resistance, Offshore structures, Concrete strength, Concrete placing.

46-1461
Japan's first ice-breaking cruise ship *Aurora*.
Akai, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.162-165, In Japanese with English summary.
Kawashima, Y.
Icebreakers, Ice navigation.

46-1462
Model test of the icebreaking cruise ship *Aurora*.
Kishi, S., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.166-170, In Japanese with English summary. 2 refs.
Narita, S.
Icebreakers, Ice navigation, Models, Test chambers.

46-1463
Development and actual testing results of paint for arctic waters.
Hirai, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.171-175, In Japanese with English summary. 4 refs.
Takagaki, T., Matsuda, N., Akamine, K.
Protective coatings, Chemical ice prevention, Ships, Offshore structures.

46-1464
Study on protective effect of finish coatings on frost damage of aerated lightweight concrete.
Yoshino, T., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.176-180, In Japanese with English summary. 1 ref.
Sogo, T., Tanikawa, S., Kamada, E.
Protective coatings, Frost protection, Lightweight concretes, Waterproofing.

46-1465
Abnormal southward drifts of sea ice off Sanriku in 1928 and 1930.
Akagawa, M., International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.184-189, In Japanese with summary. 4 refs.
Sea ice distribution, Drift, Ice conditions, Okhotsk Sea.

46-1466
Formation of ice kettles at the sandy coast of Monbetsu, Hokkaido.
Tabuchi, H., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.190-192, In Japanese with English summary.
Adachi, H.
Grounded ice, Ice erosion, Japan—Hokkaido.

46-1467
Directional wave spectra estimation in a marginal ice zone using linear prediction.
Larouche, P., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.195-197, 9 refs.
Cariou, C.
Ocean waves, Ice water interface, Ice edge, Wave propagation.

46-1468
Long-range forecast of ice conditions in the Japan Sea and the Sea of Okhotsk: problems and prospects.
Plotnikov, V.V., International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.205-208, 1 ref.
Ice forecasting, Sea ice distribution, Ice conditions, Ice edge, Long range forecasting, Japan, Sea, Okhotsk Sea.

46-1469
Observation of heat transfer process between ocean and atmosphere in ice sea—problems in observation of heat transfer process in sea ice.
Sasaki, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.209-213, In Japanese with English summary. 4 refs.
Muraji, Y., Naito, G., Nakamura, H.
Air ice water interaction, Heat transfer, Sea ice, Snow cover effect.

46-1470
Measurements of an atmospheric boundary layer over open water and over thin ice.
Shirasawa, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.214-218, 1 ref.
Aota, M., Takatsuka, T.
Air ice water interaction, Boundary layer, Drift, Wind factors.

46-1471
Polarimetry method for sea ice compression and expansion zones detection.
Hilov, A., International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.229-232.
Sea ice, Ice optics, Ice deformation, Remote sensing.

46-1472
Transmission system of static Q/L images of earth observation satellite data.
Ito, N., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.233-236, In Japanese with English summary.
Kikuchi, H., Takeuchi, H., Ogawa, M.
Ice reporting, Data transmission, Sea ice, Spaceborne photography.

46-1473
Monitoring of sea ice in the Sea of Okhotsk by multistage satellite remote sensing.
Ishida, K., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.246-250, In Japanese with English summary.
Ochiai, H.
Sea ice distribution, Remote sensing, Ice reporting, Spaceborne photography, Okhotsk Sea.

46-1474
Sea ice and waves observation with JERS-1 SAR system.
Kasai, Y., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.251-255, In Japanese with English summary.
Sea ice, Ocean waves, Remote sensing, Synthetic aperture radar, Ice reporting.

46-1475
Observation of snow cloud and snow fall by using optical radar.
Jyumonji, M., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.256-261, 7 refs.
Nagamine, N.
Snowfall, Cloud cover, Snow optics, Lasers.

46-1476
Hydrodynamic model for seasonal variability of physical fields in the Sea of Okhotsk.
Vasil'ev, A.S., International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.294-297.
Ocean currents, Water temperature, Sea water freezing, Sea ice distribution, Water transport, Mathematical models, Seasonal variations, Okhotsk Sea.

46-1477
Use of mathematical modelling for short-term forecasting of ice cover distribution in the southern Okhotsk Sea.
Appel', I.L., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.305-308.
Nikolaev, S., Pozdnyshev, S.P., Speranskiĭ, D.A.
Sea ice distribution, Ice forecasting, Mathematical models, Okhotsk Sea.

46-1478
Computation of ice extent for the Tugur tidal power plant basin.
Chuprynin, V.I., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.310-314, 4 refs.
Oreshko, A.P., Ivanov, A.V.
Sea ice distribution, Ice water interface, Ice snow interface, Dams, Electric power, Okhotsk Sea.

46-1479
On shock waves in drift-ice.
Marchenko, A.V., International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.319-323, 4 refs.
Ice floes, Drift, Ice deformation, Ice cover strength, Shock waves, Wave propagation, Analysis (mathematics).

46-1480
Preliminary statistics of some sea ice conditions in Liaodong Gulf.
Li, Z.J., et al, International Symposium on Okhotsk Sea and Sea Ice, 6th, Mombetsu, Hokkaido, Japan, Feb. 3-6, 1991. Abstracts, Mombetsu, Hokkaido University, Okhotsk Sea and Cold Ocean Research Association, 1991, p.325-328, 3 refs.
Sui, J.X., Dong, X.Y., Zhang, T.
Sea ice distribution, Ice conditions, Statistical analysis, China—Liaodong Gulf.

46-1481
Selected papers on turbulence in a refractive medium.
Andreas, E.L., ed, MP 2979, SPIE milestone series, Vol.MS 25, Bellingham, WA, International Society for Optical Engineering, 1990, 693p., Refs. passim. For selected papers see 42-3000 and 43-4400.
Atmospheric physics, Turbulence, Scintillation, Boundary layer, Wave propagation, Optical properties, Refractivity, Atmospheric attenuation.

46-1482
Experimental investigation of cold storage in packed capsules with solidification.
Chen, S.L., *Experimental heat transfer*, July-Sep. 1991, 4(3), p.263-280, 6 refs.
Cold storage, Liquid cooling, Thermal analysis, Porous materials, Solidification, Phase transformations, Heat transfer coefficient, Mathematical models, Temperature distribution.

46-1483
Review of passive microwave techniques for sea-ice research.
Stubbs, C.M., *GEC journal of research*, 1991, 8(3), p.170-178, 17 refs.
Sea ice distribution, Ice conditions, Classifications, Ice surveys, Remote sensing, Radiometry, Accuracy, Microwaves, Climatology.

46-1484
Wet dry ice.
Becker, R., *Journal of chemical education*, Sep. 1991, 68(9), p.782-783, 3 refs.
Experimentation, Education, Dry ice (trademark), Ice melting, High pressure tests.

46-1485
Greenland sea ice and salinity anomalies and interdecadal climate variability.
Mysak, L.A., et al, *Climatological bulletin*, Aug. 1991, 25(2), p.81-91, With French summary. 29 refs.
Power, S.B.
Sea ice distribution, Air ice water interaction, Salinity, Runoff, Climatic changes, Periodic variations, Climatology, Greenland Sea.

46-1486
Comment on hailswath lengths.
Paul, A.H., *Climatological bulletin*, Aug. 1991, 25(2), p.125-127, 7 refs.
Thunderstorms, Hail, Distribution, Atmospheric circulation, Agriculture.

46-1487
Exploring earth's ancient climate.
Soviero, M.M., *Popular science*, Aug. 1991, 239(2), p.70-73,88.
Paleoclimatology, Ice dating, Ice cores, Drill core analysis, Ice sheets, Research projects, Glacier ice, Climatic changes, Greenland.

46-1488
Effects of wind and snow on skylight framing systems.
Gilmer, W.B., *Construction specifier*, Mar. 1991, 44(3), p.54-72.
Buildings, Windows, Snow loads, Design, Roofs, Wind factors, Bearing strength, Engineering.

46-1489
Hydrograph separation: a comparison of geochemical and isotopic tracers.
Wels, C., et al, *Journal of hydrology*, Jan. 1991, 122(1-4), p.253-274, Refs. p.272-274.
Cornett, R.J., Lazerte, B.D.
Stream flow, Hydrography, Hydrogeochemistry, Runoff, Snowmelt, Subsurface drainage, Ground water, Watersheds, Weathering.

46-1490
Arctic news-record—Polar bulletin, Vol.7 No.4.
Wade, N., ed, Oslo, Norway, Scanews, 1991, 8p.
Petroleum industry, Offshore drilling, Environmental impact, Oil spills, Exploration.

46-1491
Distribution of chlorophyll *a* and diatom in the sea ice of the Weddell Sea, Antarctica.
Chen, X.Q., et al, *Acta oceanologica sinica*, 1991, *10(1)*, p.161-166.
Dieckmann, G.
Sea ice, Algae, Drill core analysis, Ice formation, Marine biology, Chlorophylls, Antarctica—Weddell Sea.
Diatoms are major producers of microbial biomass in Antarctica. They are found in the water and sea ice. The distribution and abundance of ice diatoms and their relation to environmental factors inside and outside the ice have been studied to determine their special role in the antarctic ocean ecology. In this paper the abundance, distribution and composition of diatom assemblages in sea ice cores is described. The possible mode of incorporation into sea ice and the etiology of different assemblages are discussed. (Auth. mod.)

46-1492
Aircraft-produced ice particles (APIPs) in supercooled clouds and the probable mechanism for their production.
Woodley, W.L., et al, *Journal of applied meteorology*, Nov. 1991, 30(11), p.1469-1489, 20 refs.
Weather modification, Supercooled fog, Homogeneous nucleation, Ice crystal growth, Aircraft, Cloud physics, Propellers, Aerial surveys.

46-1493
Effect of light intensity and spectra on the reduction of thermoluminescence of near-shore sediments from Spitsbergen, Svalbard: implications for dating Quaternary water-lain sequences.
Forman, S.L., et al, *Geophysical research letters*, Sep. 1991, 18(9), p.1727-1730, 26 refs.
Ennis, G.
Quaternary deposits, Littoral zone, Marine deposits, Age determination, Luminescence, Light effects, Glacial deposits, Turbidity.

46-1494
Application of three ASTM test methods to measure thermal resistance of clothing.
Bomberg, M., *Journal of thermal insulation*, July 1991, 15(1), p.77-98, 4 refs.
Clothing, Layers, Tests, Thermal analysis, Thermal insulation, Laboratory techniques, Cold weather performance, Accuracy.

46-1495
Roughening transition observed on the prism facet of ice.
Elbaum, M., *Physical review letters*, Nov. 18, 1991, 67(21), p.2982-2985, 18 refs.
Ice crystal growth, Ice optics, Ice crystal structure, Orientation, Ice physics, Surface properties, Phase transformations, Thermodynamics, Temperature effects.

46-1496
Comparison of beta-ray and gamma-ray transmission methods for measurement of frost density distribution.
Bong, T.Y., et al, *Experimental thermal and fluid science*, Sep. 1991, 4(5), p.567-576, 23 refs.
Wijeysundera, N.E., Saw, E.L., Lau, K.O.
Pipes (tubes), Thermal insulation, Ice formation, Hoarfrost, Measurement, Ice density, Gamma irradiation, Accuracy, Ice thermal properties.

46-1497
Frosting performance of tube fin heat exchangers with wavy and corrugated fins.
Kondepudi, S.N., et al, *Experimental thermal and fluid science*, Sep. 1991, 4(5), p.613-618, 11 refs.
O'Neal, D.L.
Heating, Pipes (tubes), Ice formation, Hoarfrost, Performance, Heat transfer coefficient, Design criteria, Thermal analysis.

46-1498
Scattering functions of the atmospheric surface layer in the polar regions.
Sakunov, G.G., et al, *Akademiia nauk SSSR. Izvestiia. Atmospheric and oceanic physics*, Sep. 1990, 26(2), p.99-103, Translated from Izvestiia. Fizika atmosfery i okeana. 7 refs.
Barteneva, O.D.
Polar atmospheres, Optical properties, Light scattering, Haze, Visibility, Transparency, Temperature effects.
Measurements of the light scattering function in the atmospheric surface layer of the polar regions are presented. Scattering functions corresponding to background conditions with a light flux asymmetry K between 1 and 1.2 and functions for dense haze (S(M) = 1 to 10 km), with the maximum occurring in the vicinity of the first and second rainbow angles at temperatures between -15 deg and -30 deg C, are presented. Differences in the form of the scattering functions related to the atmospheric transparency are investigated. (Auth. mod.)

46-1499
Hydrologic pathways and chemical composition of runoff during snowmelt in Loch Vale Watershed, Rocky Mountain National Park, Colorado, USA.
Denning, A.S., et al, *Water, air, and soil pollution*, Sep. 1991, 59(1-2), p.107-123, 39 refs.
Baron, J., Mast, M.A., Arthur, M.
Snow hydrology, Snowmelt, Runoff, Watersheds, Chemical properties, Water chemistry, Seepage, Alpine landscapes, Surface waters.

46-1500
Zinc in plants, sediments, snow and ice around a galvanized electrical transmission tower in a beaver pond.
Balch, G.C., et al, *Water, air, and soil pollution*, Sep. 1991, 59(1-2), p.145-152, 16 refs.
Jones, R.
Ponds, Power line supports, Corrosion, Plant ecology, Snow impurities, Chemical analysis, Steel structures, Sampling.

46-1501
Dynamics of weed populations in a northern subarctic community.
Staniforth, R.J., et al, *Canadian journal of botany*, Apr. 1991, 69(4), p.814-821, With French summary. 23 refs.
Scott, P.A.
Introduced plants, Growth, Subarctic landscapes, Plant ecology, Cold weather survival, Vegetation patterns, Canada—Manitoba.

46-1502
Morphology of glacial striae: implications for abrasion of glacier beds and fault surfaces.
Iverson, N.R., *Geological Society of America. Bulletin*, Oct. 1991, 103(10), p.1308-1316, 52 refs.
Glacier beds, Glacial erosion, Abrasion, Bedrock, Ice solid interface, Models, Surface structure.

46-1503
Heavily-contaminated snowfalls in the remote Scottish Highlands: a consequence of regional-scale mixing and transport.
Davies, T.D., et al, *Atmospheric environment*, 1992, 26A(1), p.95-112, 47 refs.
Snowfall, Snow impurities, Mountains, Air pollution, Atmospheric circulation, Sampling, Chemical analysis, Ion density (concentration), United Kingdom—Scotland.

46-1504
Wind related errors in different methods of solid precipitation measurement.
Günther, T., et al, *Hydrological processes*, July-Sep. 1991, 5(3), p.233-241, 6 refs.
Graf, B.
Precipitation (meteorology), Wind factors, Measurement, Accuracy, Snow accumulation, Statistical analysis, Precipitation gages, Correlation.

46-1505
Evaluation of a water equivalent of snow cover map in a small catchment area using a geostatistical approach.
Hosang, J., et al, *Hydrological processes*, July-Sep. 1991, 5(3), p.283-290, 13 refs.
Dettwiler, K.
Watersheds, Snow cover, Snow water equivalent, Runoff forecasting, Statistical analysis, Snow hydrology, Analysis (mathematics).

46-1506
Effect of artificial salting on freezing behavior of silt soil.
Eldin, N.N., *Journal of cold regions engineering*, Dec. 1991, 5(4), p.143-157, 22 refs.
Soil freezing, Frost heave, Salting, Soil stabilization, Soil tests, Soil water migration, Saline soils, Cold weather construction.

46-1507
Fracture analysis of ice forces.
Ayoub, A.S., et al, *Journal of cold regions engineering*, Dec. 1991, 5(4), p.158-173, 21 refs.
Brown, T.G.
Offshore structures, Ice floes, Ice solid interface, Impact strength, Cracking (fracturing), Stress concentration, Mathematical models, Crack propagation, Ice mechanics.

46-1508
Reactive soil pressures along pile in frozen sand.
Domaschuk, L., et al, *Journal of cold regions engineering*, Dec. 1991, 5(4), p.174-194, 6 refs.
Shields, D.H., Fransson, L.
Pile load tests, Frozen ground mechanics, Creep, Soil pressure, Dislocations (materials), Cold weather construction, Subgrades.

46-1509

Polynucleate hydrocarbons in antarctic sea ice. [Hidrocarburos polinucleados en hielos marinos antárticos].

Ventajas, L., *Buenos Aires. Instituto Antártico Argentino. Contribución*, 1991, No.384, p.1-11, In Spanish with English, French and German summaries. 3 refs.

Sea ice, Absorption, Hydrocarbons, Water pollution, Impurities, Antarctica—Belgrano II Station.

The diffusion of polynucleate hydrocarbons in sea ice over time is investigated by means of the following two experiments: ice exposed for increasing periods to water in the bilge of the icebreaker ARA *Almirante Irizar*, which showed increasing concentrations of polynucleate hydrocarbons in ice to be in direct proportion to time of exposure; and ice exposed to petroleum and sea water mixtures for different lengths of time, which showed the extent of the polynucleate hydrocarbon penetration into the ice interior to also coincide with length of exposure. It is concluded that the greatest danger of oil spills rich in polynucleate hydrocarbons lies in their penetrating the ice interior since, due to action of winds and currents, the ice is transported to uncontaminated areas which it will contaminate when it melts. (Auth. mod.)

46-1510

Polynucleate hydrocarbons in frozen and contaminated sea water and in antarctic waters at two different depths. [Hidrocarburos polinucleados en agua de mar congelada y contaminada y en aguas antárticas en dos profundidades].

Ventajas, L., *Buenos Aires. Instituto Antártico Argentino. Contribución*, 1991, No.388, p.73-87, In Spanish with English, French and German summaries. 3 refs.

Impurities, Sea ice, Sea water.

Containers with samples of sea water to which increasing quantities of petroleum were added were partly frozen, for equal periods of time and in vitro. It was found that the concentration of polynucleate hydrocarbons increased in water as well as in ice, suggesting that the diffusion phenomenon is enhanced by the polynucleate concentration. Samples of sea water to which equal quantities of petroleum were added were frozen in part for different periods of time and in vitro, showing the following: at first, the polynucleate hydrocarbon concentration in frozen water increases, remaining constant later because ice forms from surface water containing the suspended hydrocarbons. When these decrease enough, ice forms from the deeper water containing a minimum quantity of polynucleate hydrocarbons in solution. Analysis of sea water samples 0.5 m in depth showed higher concentration of hydrocarbons than that found in deeper water, which is attributed to the dense suspension of hydrocarbons in the air. (Auth. mod.)

46-1511

Photosynthesis-irradiance relationships and carbon metabolism of different ice algal assemblages collected from Weddell Sea pack ice during austral summer (EPOS 1).

Gleitz, M., et al, *Polar biology*, Oct. 1991, 11(6), p.385-392, Refs. p.391-392.

Kirst, G.O.

Sea ice, Algae, Photosynthesis, Antarctica—Weddell Sea.

In a study of algae in Weddell Sea pack ice, infiltration and interstitial assemblages exhibited the photosynthetic characteristics of high-light adapted ice algae. A higher light harvesting efficiency under light limited conditions, as well as a lower light intensity for light saturation, was determined for the interstitial assemblage. An increase in light intensity from 3.5 to 106 micro-mol/sq m/s resulted in increased synthesis of polymeric carbohydrates (presumably reserve material) in a band assemblage. However, the absolute incorporation of radiolabel into lipid- and amino acid fractions remained essentially constant over this range of photon flux densities. Light-saturated rates of photosynthesis of three infiltration assemblages under hypersaline conditions decreased by 13-55%. The adverse effect of salinity treatment was much less pronounced under hypersaline conditions. These observations suggest that sea ice microalgae in the ice edge region of the Weddell Sea during spring, being in a metabolically active stage, may have the potential to initiate or contribute to phytoplankton blooms upon release into the water column. (Auth. mod.)

46-1512

Ecological and physiological investigations in continental antarctic cryptogams. 3. Photosynthetic production of *Usnea sphacelata*: diurnal courses, models, and the effect of photoinhibition.

Kappen, L., et al, *Polar biology*, Oct. 1991, 11(6), p.393-401, Refs. p.400-401.

Breuer, M., Bölter, M.

Lichens, Photosynthesis, Snow cover effect, Antarctica—Bailey Peninsula.

Microclimate and CO2 exchange of the lichen *Usnea sphacelata* were measured during summer on a hill near Casey Station. Within a period of 52 days (Nov. 10-Dec. 31, 1985), 8 diurnal courses of net photosynthesis were measured in naturally snow-covered lichen thalli, and 9 diurnal courses in thalli experimentally sprayed with melt water. Photosynthetic performance of a light-form of *U. sphacelata* was compared with that of a shade-form. Net photosynthesis was reversibly depressed in snow-covered lichen thalli of both forms when irradiance was higher than 600 micro-mol/sq m/s photosynthetic active radiation (PAR), the depression persisting several hours after a period of strong light. These responses suggest photoinhibition. The study has shown that long-term calculation of the photosynthetic productivity must take into account decreases in net photosynthesis rate caused by strong light, as well as effects of water content and temperature. For the investigated period of the austral summer, a carbon production of 3.44 g sq m was estimated for *U. sphacelata*. (Auth. mod.)

46-1513

GPS in Antarctica. Report of a workshop: Utilization of the Global Positioning System (GPS) in addressing scientific problems in Antarctica.

Elliot, D.H., ed, *Byrd Polar Research Center. Technical report*, 1991, BPRC TR 91-02, 37p.

Strange, W., ed, Whillans, I.M., ed.

Geodetic surveys, Measuring instruments, Glaciology, Tectonics.

A meeting was held in Mar. 1991, at Ohio State University to discuss the future of the use of the Global Positioning System (GPS) in Antarctica. The first topic for consideration in GPS work is the security and stability of the reference, or fiducial, network. This network is already being developed; two field campaigns have recently been completed that seek to tie McMurdo Station into reference stations in Australia and New Zealand and the rest of the world, as well as to other reference sites around Antarctica. Very Long Baseline Interferometer (VLBI) and Satellite Laser Ranging (SLR) currently provide the worldwide fiducial network. It is extremely important to connect Antarctica to the global VLBI reference frame. VLBI stations are planned for Showa, O'Higgins, and McMurdo. The participants in the workshop strongly endorse the efforts to provide a strong reference frame for Antarctica. Discussions also centered on the best methods for conducting GPS campaigns. It was decided that no central planning was needed except for the installation and long-term operation and maintenance of fiducial stations and the need for documentation of the fiducial sites. Each investigator should be responsible for contacting the operators of fiducial stations, and operating their own networks designed to address specific scientific problems.

46-1514

Comparison between SSMR and SSM/I passive microwave data collected over the antarctic ice sheet.

Jezek, K.C., et al, *Byrd Polar Research Center. Technical report*, 1991, BPRC TR 91-03, 62p., 10 refs.

Ice sheets, Microwaves, Brightness, Temperature measurement, Data processing, Radiometry.

Passive microwave brightness temperature data collected during the overlap period between the Scanning Multichannel Microwave Radiometer and the Special Sensor Microwave Imager are compared. Only data collected over the Antarctic Ice Sheet are used in order to limit spatial and temporal complications associated with the open ocean and sea ice. Linear regressions are computed from scatter plots of complementary pairs of channels from each sensor, revealing highly correlated data sets. That a simple linear model can be used to correlate the data is used to support the argument that there are important relative calibration differences between the two instruments. (Auth.)

46-1515

Legacy of the Seasat mission for studies of the atmosphere and air-sea-ice interactions.

Katsaros, K.B., et al, *American Meteorology Society. Bulletin*, July 1991, 72(7), p.967-981, Refs. p.979-981.

Brown, R.A.

Spacecraft, Meteorology, Climatology, Air ice water interaction, Radiometry, Atmospheric circulation, Remote sensing, Weather forecasting, Microwaves.

46-1516

Research on clouds and precipitation: past, present and future, part 2.

Hobbs, P.V., *American Meteorology Society. Bulletin*, Feb. 1991, 72(2), p.184-191, 1 ref.

Clouds (meteorology), Precipitation (meteorology), Atmospheric physics, Cloud physics, Research projects.

46-1517

Distribution characteristics of trace elements and ionic species of aerosol collected at Canadian High Arctic.

Cheng, M.D., et al, *Atmospheric environment A*, 1991, 25(12), p.2903-2909, 15 refs.

Hopke, P.K., Landsberger, S., Barrie, L.A.

Polar atmospheres, Aerosols, Air pollution, Atmospheric composition, Distribution, Chemical analysis, Statistical analysis, Ions, Canada—Northwest Territories.

46-1518

NaCl-H2O systems at temperatures below 273 K, studied by differential scanning calorimetry.

Hvidt, A., et al, *Thermochimica acta*, Feb. 1991, 175(1), Nordic Symposium on Thermal Analysis and Calorimetry, 12th, Roskilde, Denmark, June 19-21, 1990. Proceedings. Edited by P.J. Möller and O.T. Sörensen, p.53-58, 9 refs.

Borch, K.

Solutions, Liquid cooling, Salt water, Ice water interface, Temperature measurement, Ice formation, Cryobiology, Enthalpy.

46-1519

On the impact of snow cover on daytime pollution dispersion.

Segal, M., et al, *Atmospheric environment B*, 1991, 25(2), p.177-192, 30 refs.

Snow cover effect, Turbulent diffusion, Air pollution, Snow air interface, Heat flux, Air flow, Turbulent boundary layer, Particle size distribution.

46-1520

Thermodynamic properties of propane hydrate in the neighborhood of the hydrate-ice and hydrate-water phase transition points.

Buleiko, V.M., et al, *USSR Academy of Sciences Transactions. Earth science sections*, July 1991, 309(1-6), p.91-94, 6 refs. For Russian original see 44-2610.

Makogon, IU.F.

Hydrates, Natural gas, Thermodynamic properties, Phase transformations, Ice formation, Ice melting, Temperature measurement, Heat capacity.

46-1521

Optimal method of disaggregation of frozen and thawed sandy-clayey rocks.

Shirman, V.G., et al, *USSR Academy of Sciences Transactions. Earth science sections*, July 1991, 309(1-6), p.129-130, 3 refs. For Russian original see 44-2248.

Zakharova, S.M., Rumiantsev, G.V.

Frozen rocks, Mining, Decomposition, Rock mechanics, Hydraulics, Ice solid interface.

46-1522

Gas survey of snow cover in the Kuznetsk Basin.

Vyshemirskiĭ, V.S., et al, *USSR Academy of Sciences. Transactions. Earth science sections*, July 1991, 309(1-6), p.172-174, 4 refs. For Russian original see 44-2605.

Khakimzianov, R.S., Shugurov, V.F.

Snow cover, Snow surveys, Snow composition, Gases, Exploration, Coal, Mining, Geological surveys.

46-1523

Paleovariations of CO2 content in antarctic ice cores.

Semiletov, I.P., et al, *USSR Academy of Sciences. Transactions. Earth science sections*, July 1991, 309(1-6), p.245-247, 14 refs. For Russian original see 44-2606 or 18F-41641.

Ice cores, Ice sheets, Drill core analysis, Carbon dioxide, Paleoclimatology, Climatic changes, Antarctica - Vostok Station.

This paper presents the first measurements of atmospheric CO2 in the air inclusions of antarctic ice cores more than 60,000 years old, obtained from a unique drillhole at the Soviet Vostok Station and a drillhole at Kilometer 150 on the traverse from Mirnyy to Vostok. (Auth. mod.)

46-1524

Limnological properties of antarctic ponds during winter freezing.

Schmidt, S., et al, *Antarctic science*, Dec. 1991, 3(4), p.379-388, 22 refs.

Moskal, W., De Mora, S.J., Howard-Williams, C., Vincent, W.F.

Limnology, Algae, Ice cover effect, Antarctica—Ross Island.

Two shallow ponds at Cape Evans, Ross I., were sampled at 1-2 weeks intervals during winter freezing throughout the winter and during the subsequent melt period, to examine the physical and chemical conditions imposed on the biota during the year. Liquid water was first detected at the base of the ponds in late Dec. During the main summer melt period conductivities were less than 10 mS/cm with maximum daily temperatures around 5 C. The bottom waters became increasingly saline during freezing and water temperatures decreased below 0 C by June the remaining water overlying the sediments had conductivities > 150 mS/cm and temperatures of -13 C. Calcium carbonate, then sodium sulphate precipitated out of solution during early freezing. This study provides clear evidence that organisms which persist throughout the year in antarctic coastal ponds must be capable of surviving much more severe osmotic, pH, temperature and redox conditions than those measured during the summer melt. Deoxygenation, pH decline and H2S production, however, point to continued respiratory activity well into the dark winter months. (Auth. mod.)

46-1525

Implications of a Pliocene stand of Nothofagus (southern beech) within 500 kilometres of the South Pole.

Burckle, L.H., et al, *Antarctic science*, Dec. 1991, 3(4), p.389-403, Refs. p.400-403.

Pokras, E.M.

Algae, Paleoclimatology, Paleobotany, Ice cover, Antarctica—Beardmore Glacier.

Branches, stems and roots of *Nothofagus* (southern beech) were reported from the Beardmore Glacier area (Sirius Formation) some 500 km from the South Pole. The Sirius Formation is a glacially derived unit which is considered Pliocene in age. Two scenarios are considered by which a *Nothofagus* forest could flourish so close to the South Pole during the Pliocene: the

disappearance of this genus from Antarctica during the early Tertiary (Oligocene) and its re-introduction during a warm Pliocene interval, or survival of *Nothofagus* in antarctic *refugia* through middle Tertiary glacial advances and its flourishing during a Pliocene warming. Excluding its occurrence in the Beardmore Glacier area, the known range of this genus in Antarctica is Cretaceous to Oligocene with some questionable occurrences in the early Miocene. The existing data do not support the *refugia* scenario. It is concluded that the occurrence of *Nothofagus* in the Beardmore Glacier area is older than Pliocene. Instead, it is suggested that it represents a relict assemblage which is probably no younger than Oligocene but which may have persisted into the early Miocene. (Auth. mod.)

46-1526

On the thermohaline circulation beneath the Filchner-Ronne ice shelves.

Hellmer, H.H., et al. *Antarctic science*, Dec. 1991, 3(4), p.433-442, 26 refs.

Olbers, D.J.

Ocean currents, Water chemistry, Water temperature, Salinity, Ice shelves, Antarctica - Filchner Ice Shelf, Antarctica--Ronne Ice Shelf.

The Weddell Sea oceanographic data and numerical models demonstrate that Ice Shelf Water, one ingredient in the production of Weddell Sea Bottom Water, is formed by thermohaline interaction of High Salinity Shelf Water with the base of the Filchner-Ronne ice shelves. South of Berkner I. a passage with a water column thickness of about 300 m linking the Filchner and the Ronne regimes is important for the ventilation of the sub-ice shelf cavities. To simulate the flow, a two-dimensional thermohaline circulation model was tested on several sections which approximate different geometries of a sub-ice shelf channel bounded by the ocean bottom and the ice shelf base. Temperature and salinity profiles measured in front of the Filchner-Ronne ice shelves are used to force the model. The results indicate that the circulation is sensitive to both salinity (density) forcing and depth of the shelf bottom prescribed at the open boundary representing the Ronne Ice Shelf edge. Where the shelf is shallow (400 m deep), a closed circulation cell within the Ronne cavity acts like an ice pump with accumulation rates of marine ice at the ice shelf base up to 1.5 m/y. The total outflow at the Ronne Ice Shelf edge is supported by an inflow from the Filchner regime. Where the shelf is deeper, a flow from the Ronne into the Filchner cavity develops if the bottom salinity at the Ronne Ice Shelf edge exceeds a critical value of 34.67. Seasonal variability imposed at both edges modifies the circulation pattern at the Filchner Ice Shelf edge such that the depth and magnitude of Ice Shelf Water outflow correspond with observations in the Filchner Depression. (Auth.)

46-1527

Glacial facies models; continental terrestrial environments.

Shaw, J., et al, Boulder, CO, Geological Society of America, 1988, 121p., Refs. p.66-78, 102-105, 119-121. Supplement to Glacial sedimentary environments, edited by G.M. Ashley, J. Shaw, and N.D. Smith, for which see 40-905.

Ashley, G.M.

Glacial deposits, Glacial geology, Ice sheets, Glacial erosion, Glaciation, Periglacial processes, Glacial lakes, Outwash, Sedimentation.

46-1528

Calculation of size-effect of blowing snow particles by the snow particle counter (Second report).

Sato, A., *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Mar. 1991, No.47, p.19-23, In Japanese with English summary. 2 refs.

Blowing snow, Particle size distribution, Meteorological instruments, Snow optics, Visibility, Analysis (mathematics).

46-1529

Sublimation rate of collected blowing snow in a collector; a case of net type collector.

Sato, T., *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Mar. 1991, No.47, p.25-46, In Japanese with English summary. 8 refs.

Blowing snow, Snow evaporation, Meteorological instruments, Snow air interface, Sublimation, Analysis (mathematics).

46-1530

Nitric acid trihydrate particle formation in the polar stratosphere and its effect on nitric acid transport to the troposphere.

Iwasaka, Y., et al, *Journal of geomagnetism and geoelectricity*, 1991, 43(8), p.667-675, 17 refs.

Hayashi, M.

Polar atmospheres, Atmospheric composition, Atmospheric physics, Stratosphere, Cloud physics, Ozone, Impurities.

Growth and sedimentation of type-I polar stratospheric cloud (PSCs) particles including nitric acid are examined using a numerical model. The PSC particles which grow in the upper particle layer have large enough size (about 10 microns) to descend rapidly to the tropopause within several days. In the lower part of the PSCs layer, evaporation of HNO_3 from particulate matter occurs and acts as a source of HNO_3 vapor. From the viewpoint of stratospheric HNO_3 distribution, the particle sedimentation effectively functions as a vertical transport mechanism of HNO_3 vapor from the upper PSC layer to the lower layer and/or to the troposphere. Data from antarctic stations are cited. (Auth. mod.)

46-1531

Pleistocene stratigraphic units of Wisconsin 1984-1987.

Attig, J.W., ed, *Wisconsin Geological and Natural History Survey. Information circular*, 1988, No.62, 61p., 26 refs.

Clayton, L., ed, Mickelson, D.M., ed.

Pleistocene, Quaternary deposits, Stratigraphy, Geological surveys, Glacial deposits, United States - Wisconsin.

46-1532

Disperion and transport paths of toxic persistent organochlorines to the Arctic—levels and consequences.

Oehme, M., *Science of the total environment*, July 1, 1991, 106(1-2), p.43-53, 37 refs.

Polar atmospheres, Air pollution, Hydrocarbons, Atmospheric circulation, Chemical properties, Air masses, Biomass, Environmental impact.

46-1533

Numerical experiments on the effect of Qinghai-Xizang Plateau snow cover on summer monsoon formation.

Zhang, Z.Q., et al, *Acta meteorologica sinica*, 1991, 5(4), p.442-455, 18 refs.

Li, W.L., Chen, L.X.

Precipitation (meteorology), Rain, Snow cover effect, Meteorological factors, Surface temperature, Snow air interface, Mathematical models, Heat balance, China—Qinghai-Xizang Plateau.

46-1534

On ice forming nuclei.

Rosinski, J., et al, *Acta meteorologica sinica*, 1991, 5(4), p.497-513, 30 refs.

Haagenson, P.L., Nagamoto, C.T., Morgan, G.

Clouds (meteorology), Cloud physics, Condensation nuclei, Ice crystal growth, Heterogeneous nucleation, Aerosols, Temperature effects, Atmospheric circulation.

46-1535

Scattering phase matrices of ice crystals with hexagonal prism and triangular pyramid form—a vector ray tracing method.

Cai, Q.M., et al, *Acta meteorologica sinica*, 1991, 5(4), p.515-526, 13 refs.

Yang, P.

Ice models, Ice crystal optics, Ice crystal structure, Light scattering, Clouds (meteorology), Analysis (mathematics), Wave propagation.

46-1536

Systems and means of marine radio communication; collection of scientific papers. [Sistemy i sredstva morskoĭ radiosviazi; sbornik nauchnykh trudov].

Peresypkin, V.I., ed, Moscow, Transport, 1990, 151p., In Russian. For selected papers see 46-1537 through 46-1540 or G-45233, G-45234 and I-45232.

Ice reporting, Radio communication, Data processing, Telecommunication, Weather observations, Spaceborne photography.

Results of modeling and evaluations of the effectiveness of the systems and technical means of maritime radio communication, as well as the transmission of information about accidents at sea, are presented in this collection of papers. Data on the characteristics of radio channels, display methods, and radio signal processing are also given. Specific topics in this collection include the gathering of hydrometeorological data in the Soviet Antarctic Expedition, managing information exchange in Antarctica, and the International Maritime Satellite Communications System at coastal antarctic research stations.

46-1537

System of gathering hydrometeorological information in the Soviet Antarctic Expedition and its prospects. [Sistema sbora gidrometeorologicheskoĭ informatsii v sovetskoĭ antarkticheskoĭ ekspeditsii i ee perspektivy].

Safronov, V.A., Sistemy i sredstva morskoĭ radiosviazi; sbornik nauchnykh trudov (Systems and means of marine radio communication; collection of scientific papers). Edited by V.I. Peresypkin, Moscow, Transport, 1990, p.41-49, In Russian.

Ice reporting, Data processing, Weather observations, Meteorological data, Radio communication, Telecommunication, Ice conditions.

This paper is an analysis of the existing systems of gathering, processing, transmitting, and disseminating hydrometeorological data by the observation network in Antarctica, which is comprised of antarctic stations and the ships navigating in the southern ocean, supplying synoptic telegrams. The volume of information that must be transmitted along the communication channels is examined. (Auth. mod.)

46-1538

Radiometric correction of satellite information on ice conditions. [Radiometricheskaia korrektsiia sputnikovoĭ ledovoĭ informatsii].

Likhachev, A.V., Sistemy i sredstva morskoĭ radiosviazi; sbornik nauchnykh trudov (Systems and means of marine radio communication; collection of scientific papers). Edited by V.I. Peresypkin, Moscow, Transport, 1990, p.49-52, In Russian. 3 refs.

Ice reporting, Radiometry, Ice conditions, Spaceborne photography, Analysis (mathematics).

46-1539

Managing the exchange of facsimile information in Antarctica. [Organizatsiia obmena faksimil'noĭ informatsiei v Antarktide].

Safronov, V.A., et al, Sistemy i sredstva morskoĭ radiosviazi; sbornik nauchnykh trudov (Systems and means of marine radio communication; collection of scientific papers). Edited by V.I. Peresypkin, Moscow, Transport, 1990, p.52-56, In Russian.

Kharnovetskiĭ, F.V.

Data processing, Radio communication, Spaceborne photography, Meteorological instruments, Telecommunication, Ice navigation.

The authors examine problems in managing the transmission of hydrometeorological information from Antarctica over satellite communications channels using the numerical facsimile group 3 for the purpose of developing a system of scientific-operational security in navigation and scientific investigations in the southern ocean. The organization of the facsimile communications and characteristics of the equipment are described. (Auth. mod.)

46-1540

Conversion of an analog image of ice information into digital form. [Preobrazovanie analogovogo izobrazheniia ledovoĭ informatsii v tsifrovuiu formu].

Likhachev, A.V., Sistemy i sredstva morskoĭ radiosviazi; sbornik nauchnykh trudov (Systems and means of marine radio communication; collection of scientific papers). Edited by V.I. Peresypkin, Moscow, Transport, 1990, p.56-63, In Russian. 8 refs.

Analysis (mathematics), Ice reporting, Ice conditions, Spaceborne photography, Data processing.

46-1541

Antarctica as an exploration frontier—hydrocarbon potential, geology, and hazards.

St. John, B., ed, AAPG studies in geology, No.31, Tulsa, OK, American Association of Petroleum Geologists, 1990, 154p., Refs. passim. For selected papers see 45-3756 and 46-1542 through 46-1548.

Exploration, Marine geology, Hydrocarbons, Bottom sediment, Seismic surveys, Tectonics, Natural resources, Stratigraphy, Antarctica.

46-1542

Evolution and hydrocarbon potential of the northern Antarctic Peninsula continental shelf.

Anderson, J.B., et al, Antarctica as an exploration frontier—hydrocarbon potential, geology, and hazards. Edited by B. St. John, Tulsa, OK, American Association of Petroleum Geologists, 1990, p.1-12, 39 refs.

Pope, P.G., Thomas, M.A.

Exploration, Marine geology, Hydrocarbons, Bottom sediment, Oceanographic surveys, Natural resources, Tectonics, Antarctica—Antarctic Peninsula.

46-1543

Sequence stratigraphy of the Bransfield Basin, Antarctica: implications for tectonic history and hydrocarbon potential.

Jeffers, J.D., et al, Antarctica as an exploration frontier—hydrocarbon potential, geology, and hazards. Edited by B. St. John, Tulsa, OK, American Association of Petroleum Geologists, 1990, p.13-29, 44 refs.

Anderson, J.B.

Exploration, Marine geology, Hydrocarbons, Tectonics, Bottom sediment, Stratigraphy, Seismic surveys, Natural resources, Antarctica - Bransfield Strait.

46-1544

Geology and hydrocarbon potential of the Ross Sea, Antarctica.

Cooper, A.K., et al, Antarctica as an exploration frontier—hydrocarbon potential, geology, and hazards. Edited by B. St. John, Tulsa, OK, American Association of Petroleum Geologists, 1990, p.47-67, 86 refs.

Davey, F.J., Hinz, K.

Exploration, Marine geology, Hydrocarbons, Bottom sediment, Natural resources, Stratigraphy, Antarctica - Ross Sea.

46-1545
Multichannel seismic reflection surveys over the antarctic continental margin relevant to petroleum resource studies.
Behrendt, J.C., Antarctica as an exploration frontier hydrocarbon potential, geology, and hazards. Edited by B. St. John, Tulsa, OK, American Association of Petroleum Geologists, 1990, p. ?-75, 29 refs.
Exploration, Marine geology, Hydrocarbons, Seismic surveys, Natural resources, Antarctica.

46-1546
Geology and petroleum potential of the Adélie Coast margin, East Antarctica.
Wannesson, J., Antarctica as an exploration frontier-hydrocarbon potential, geology, and hazards. Edited by B. St. John, Tulsa, OK, American Association of Petroleum Geologists, 1990, p.77-87, 53 refs.
Marine geology, Exploration, Hydrocarbons, Bottom sediment, Seismic surveys, Natural resources, Antarctica—Adélie Coast.

46-1547
Stratigraphy, setting and hydrocarbon potential of the Mesozoic sedimentary basins of the Antarctic Peninsula.
Macdonald, D.I.M., et al, Antarctica as an exploration frontier—hydrocarbon potential, geology, and hazards. Edited by B. St. John, Tulsa, OK, American Association of Petroleum Geologists, 1990, p.101-125, Refs. p.122-125.
Butterworth, P.J.
Exploration, Hydrocarbons, Stratigraphy, Tectonics, Marine geology, Natural resources, Antarctica—Antarctic Peninsula.

46-1548
Petroleum geology from the CIROS-1 drill hole, McMurdo Sound: implications for the potential of the Victoria Land Basin, Antarctica.
Collen, J.D., et al, Antarctica as an exploration frontier—hydrocarbon potential, geology, and hazards. Edited by B. St. John, Tulsa, OK, American Association of Petroleum Geologists, 1990, p.143-151, 57 refs.
Barrett, P.J.
Exploration, Marine geology, Hydrocarbons, Drill core analysis, Bottom sediment, Natural resources, Stratigraphy, Geochemistry, Antarctica—McMurdo Sound.

46-1549
Interrelation of glaciotectonic and glaciodepositional processes within the glacial environment.
Hart, J.K., et al, *Quaternary science reviews*, 1991, 10(4), p.335-350, 106 refs.
Boulton, G.S.
Ice sheets, Ice deformation, Sediments, Tectonics, Glacial geology.

46-1550
Element distribution of some soils of continental Chile and the Antarctic Peninsula. Projection to atmospheric pollution.
Carrasco, M.A., et al, *Water, air, and soil pollution*, 1991, Vols.57-58, p.713-722, 16 refs.
Prendez, M.
Geocryology, Soil chemistry, Air pollution, Antarctica—King George Island, Antarctica—Doumer Island.
The elemental content of some soils of continental Chile and the Antarctic Peninsula are reported. The elements Al, Cr, Mn, Fe, Co, Ni, Cu, Zn, Cd and Pb were analyzed. Trace elements differed among soils. The values for Cd are greater than those reported elsewhere. The organic matter content was observed to have a great importance in the Antarctic Peninsula soils. Differences between local element contents and the mean concentration values for the terrestrial crust were found. In order to get a better determination of the origin of the aerosol, the enrichment factor used as a criterion to establish the origin of the trace elements in the atmospheric aerosols should be recalculated based on the local soil. (Auth.)

46-1551
Direct ultratrace determination of cadmium in antarctic and Greenland snow and ice by laser atomic fluorescence spectrometry.
Bolshov, M.A., et al, *Analytica chimica acta*, Oct. 21, 1991, 251(1-2), p.169-175, 27 refs.
Ice sheets, Snow, Minerals, Chemical composition, Ice spectroscopy, Antarctica—Wilkes Land, Greenland.
Results of the first direct measurements of Cd in antarctic and Greenland ancient ice and recent snow at ultratrace levels of ultrasensitive laser-excited atomic fluorescence spectrometry with electrothermal atomization are presented. Ultratrace concentration Cd standards allowed calibration of the spectrometer down to the 0.1 pg Cd/g level. The limit of detection was found to be as low as about 0.01 pg Cd/g using 50-microliter sample volumes, which corresponds to a minimum detected Cd absolute mass of about 0.5 fg. Various antarctic and Greenland samples were then analyzed without any preliminary preconcentration step. (Auth.)

46-1552
Morphology and density of ice accreted on cylindrical collectors at low values of impaction parameter. 1: Fixed deposits.
Levi, L., et al, *Royal Meteorological Society. Quarterly journal A*, July 1991, 117(500), p.761-782, 21 refs.
Nasello, O.B., Prodi, F.
Ice accretion, Ice solid interface, Hoarfrost, Ice density, Drops (liquids), Surface structure, Ice physics, X ray analysis, Impact.

46-1553
Morphology and density of ice accreted on cylindrical collectors at low values of impaction parameter. 2: Rotating deposits.
Prodi, F., et al, *Royal Meteorological Society. Quarterly journal A*, July 1991, 117(500), p.783-801, 17 refs.
Levi, L., Nasello, O.B., Lubart, L.
Ice accretion, Ice solid interface, Hoarfrost, Ice density, Drops (liquids), Surface structure, Ice physics, X ray analysis, Impact.

46-1554
Behaviour of aluminium species during snowmelt, both downstream and after mixing with nonacidic waters.
Herrmann, R., et al, *Aqua fennica*, 1989, 19(2), p.87-94, 25 refs.
Klemm, K., Tacken, E.
DLC GB727.4.A65
Snowmelt, Water pollution, Runoff, River flow, Hydrogeochemistry, Precipitation (meteorology), Chemical properties.

46-1555
Perturbation based model of heat-induced suppression of river ice.
Sarraf, S., et al, *Nordic hydrology*, 1987, 18(4-5), p.221-236, 12 refs.
Saleh, W.
River ice, Ice melting, Water temperature, Waste disposal, River flow, Heating, Ice control, Mathematical models, Ice forecasting.

46-1556
Forecasting watercooling in the Kattegat, the Öresund, the Belt Sea and the Arkona Basin.
Omstedt, A., *Nordic hydrology*, 1987, 18(4-5), p.247-258, 4 refs.
Sea water, Cooling, Water temperature, Sea ice distribution, Ice formation, Forecasting, Surface temperature, Mathematical models, Baltic Sea.

46-1557
Transport and chemodynamics of organic micropollutants and ions during snowmelt.
Schöndorf, T., et al, *Nordic hydrology*, 1987, 18(4-5), p.259-278, 51 refs.
Herrmann, R.
Snowmelt, Runoff, Snow impurities, Snow composition, Pollution, Meltwater, Chemical analysis, Metamorphism (snow).

46-1558
Thirty-first Soviet Antarctic Expedition. Winter studies of 1985-1987. [Tridtsat' pervaia Sovetskaia antarkticheskaia ekspeditsiia. Zimovochnye issledovaniia 1985-1987 gg.]
Sovetskaia antarkticheskaia ekspeditsiia, *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.89, 124p., In Russian. Refs. passim. For individual see F-45240, F-45243, F-45247 through F-45250, I-45239, I-45241, I-45242, I-45244, I-45246 and J-45245, or 46-1559 through 46-1565.
Dubovtsev, V.F., ed.
Expeditions, Ice navigation, Polar regions.
This volume contains information on observations and results of scientific efforts carried out by the 31st Soviet Antarctic Expedition in the winters of 1985-1987 on the antarctic continent and surrounding waters. Seasonal activities and organization of the expedition, including logistic support and contact with non-Soviet expeditions, are outlined in the first part of the book. The second part consists of 12 individual papers giving the scientific results of projects in meteorology, synoptics, geophysics, oceanology and climatology.

46-1559
Radar observation of icebergs in Alasheyev Bight. [Radiolokatsionnye nabliudeniia za aĭsbergami v zalive Alasheeva]
Mikhailov, N.F., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.89, p.42-45, In Russian.
Electronic equipment, Icebergs, Radio communication, Antarctica—Alasheyev Bight.
Data on the direction, speed and height of about 200 icebergs drifting during 1986 in Alasheyev Bight 70-150 km from the coast, monitored by radio located in the vicinity of Molodezhnaya Station, are discussed and their trajectories are illustrated.

46-1560
Comparative radio observations of meteorological conditions on the runways of Gora Vechernaya and Gora Gorodkov at Molodezhnaya Station. [Sravnitel'nye radiolokatsionnye nabliudeniia za meteorologicheskimi usloviiami VPP gor Vechernei i Gorodkova na AMTS Molodezhnoi]
Mikhailov, N.F., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.89, p.45-47, In Russian.
Weather observations, Electronic equipment, Aircraft landing areas, Snow.
A 1986 355-day study of weather conditions leading to probability of closing down the runways at Gora Gorodkov and Gora Vechernaya to flights of heavy airplanes and work on the runway is discussed. Results, shown in a table with month to month probability values, indicate more than 26 days in which the runways were closed both to flights and routine work.

46-1561
Ice drifting properties in the Russkaya Station region. [Osobennosti dreĭfa l'da v raĭone stantsii Russkoĭ]
IUlin, A.V., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.89, p.50-57, In Russian. 5 refs.
Chugui, I.V.
Ice navigation, Sea ice, Drift, Wind factors, Antarctica—Russkaya Station.
Data from observations of sea ice movement, carried out on the *Mikhail Somov* during its forced drift in the vicinity of Russkaya Station in 1985, are analyzed. Statistics on the ice drift speed, stability, direction and on wind effects are presented. A quantitative assessment is made, using a correlation method, of the drift and surface circulation variables.

46-1562
Morphologic properties of the Pacific ice massif. [Morfologicheskie osobennosti Tikhookeanskogo ledianogo massiva]
Krivoshein, V.K., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.89, p.80-89, In Russian. 18 refs.
Sea ice, Ice breakup, Ice formation, Ice volume, South Pacific Ocean, Antarctica—Bellingshausen Sea, Antarctica—Russkaya Station.
Based on Meteor satellite data, a study is reported of the variability of horizontal dimensions of ice blocks of the Pacific ice massif, the Bellingshausen Sea and the Russkaya Station area, from Nov. 1982 to Mar. 1983. Ice cover changes, from the onset of melting to the formation of new ice, and the intensity of the breakup, are discussed and shown in graphs. It is found that the larger blocks of ice disintegrate faster than those of small size which, in turn, freeze more intensely. Ice cover disintegration begins one month earlier in the Bellingshausen Sea than in the Russkaya Station area.

46-1563
Spatial and temporal variability of ice concentration in the South Pacific Ocean. [Prostranstvenno-vremennaia izmenchivost' splochennosti l'da v tikhookeanskom sektore IUzhnogo okeana]
Krivoshein, V.K., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.89, p.89-98, In Russian. 6 refs.
Sea ice, Ice volume, Ice density, South Pacific Ocean.
The effect of different ice concentrations on general ice conditions in the Pacific section of the southern ocean, during changes of total ice volume, is evaluated. The correlation between the ice surface area and different density, and their changes in time, is calculated and shown in graphs.

46-1564
Giant icebergs in the Weddell Sea. [Gigantskie aĭsbergi moria Ueddella]
Bessonov, V.I., et al, *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.89, p.99-108, In Russian. 5 refs.
Morozov, E.L., Provorkin, A.V.
Icebergs, Drift, Ice shelves, Calving, Antarctica—Weddell Sea.
Calving of the Larsen and Filchner ice shelves, resulting in 3 giant icebergs drifting in the Weddell Sea, were observed by satellite in 1986; their trajectory was followed through May 1988. The causes of the calvings are discussed, and data on the iceberg drift are presented.

46-1565
Effect of coastal configuration on the ice regime of antarctic marginal seas. [Vliianie konfiguratsii poberezh'ia na ledovyĭ rezhim okrainnykh antarkticheskikh morei]
Korotkov, A.I., *Sovetskaia antarkticheskaia ekspeditsiia. Trudy*, 1990, Vol.89, p.108-117, In Russian. 19 refs.
Sea ice, Ice sheets, Polynyas, Coastal topographic features.
From a review of pertinent literature, the configuration and dynamics of the coastal ice cover, the surface ocean circulation and the prevailing coastal winds are found to be important physical and geographic factors in the formation and development of polynyas. The ice conditions in the Somov and Amundsen Sea, from the Meteor satellite data obtained on Feb 18 and 19, 1987, are illustrated.

46-1566
Frost resistance of high-strength concrete.
Hammer, T.A., et al, International Symposium on Utilization of High Strength Concrete, 2nd, Berkeley, CA, May, 1990. Edited by W.T. Hester, Detroit, MI, American Concrete Institute, 1990, p.457-473, SP-121-23, 19 refs.
Sellevold, E.J.
DLC TA440.H55
Concrete durability, Concrete strength, Frost resistance, Freeze thaw tests, Air entrainment, Porosity, Cold weather tests.

46-1567
Cold weather polymer concrete repair to Palisades Dam, Idaho.
Smoak, W.G., Symposium on Polymers in Concrete, 6th, Orlando, FL, 1988. Advances and applications. Edited by P. Mendis and C. McClaskey, Detroit, MI, American Concrete Institute, 1989, p.27-33, SP-116-3.
DLC TA443.P58 P643
Dams, Winter concreting, Concrete aggregates, Polymers, Winter maintenance, Cold weather construction.

46-1568
Stretching density of states of the deuterium sites in polycrystalline D2O.
Andreani, C., et al, *Molecular physics*, July 1991, 73(4), p.737-743, 15 refs.
Mayers, J., Postorino, P., Ricci, M.A.
Deuterium oxide ice, Ice physics, Neutron scattering, Molecular structure, Spectra, Low temperature tests.

46-1569
Simulation of lake ice and its effect on the late-Pleistocene evaporation rate of Lake Lahontan.
Hostetler, S.W., *Climate dynamics*, July 1991, 6(1), p.43-48, 21 refs.
Lake ice, Ice cover effect, Water temperature, Lake water, Evaporation, Simulation, Pleistocene, Climatic factors, Surface energy.

46-1570
Ion irradiation experiments relevant to cometary physics.
Strazzulla, G., et al, *Journal of geophysical research*, Sep. 25, 1991, 96(E2), p.17,547-17,552, 25 refs.
Leto, G., Baratta, G.A., Spinella, F.
Extraterrestrial ice, Simulation, Ionization, Radiation absorption, Photochemical reactions, Spectra, Molecular structure, Low temperature research.

46-1571
Study of sea ice classification by radar observation.
Sun, Y.W., et al, *Acta oceanologica sinica*, 1991, 10(2), p.317-323.
Radar tracking, Sea ice, Ice floes, Classifications, Radar echoes, Data processing, Scattering.

46-1572
Observations on chemical composition of supercooled cloud and snow.
Huang, S.H., et al, *Acta meteorologica sinica*, 1991, 5(1), p.123-127, 7 refs.
Mo, T.L., Wang, M.K.
Supercooled clouds, Precipitation (meteorology), Snowfall, Snow composition, Chemical properties, Cloud droplets, Ion density (concentration), Sampling, Air pollution.

46-1573
On the mechanics of frost damage to brick masonry.
Kralj, B., et al, *Computers & structures*, 1991, 41(4), p.53-66, 19 refs.
Pande, G.N., Middleton, J.
Masonry, Bricks, Frost action, Damage, Computerized simulation, Thermal expansion, Porosity, Freeze thaw cycles.

46-1574
Earth crust and effective topography of Antarctica. [Zemnaia kora i effektivnyi rel'ef Antarktidy].
Grushinskii, N.P., et al, Gravimetricheskie i magnitnye issledovaniia na more (Gravity and magnetic investigations at sea). Edited by P.A. Stroev and A.G. Rodnikov, Moscow, MGKP AN SSSR, 1989, p.163-168, In Russian. 11 refs.
Stroev, P.A., Grushinskii, A.N., IAtsenko, E.V.
Gravity, Tectonics, Subglacial observations, Topographic maps, Topographic surveys, Ice cover thickness, Antarctica East Antarctica, Antarctica—West Antarctica.
The correlation between earth crust thickness and Bouguer gravity anomalies for Antarctica are calculated by using deep seismic sounding and gravity data. A map of earth crust thickness is compiled. The effective heights of the continent are calculated and a map of effective topography is compiled. The term "effective height" means the height of the continent surface, assuming that the ice cover is condensed to the average density of the earth crust. (Auth. mod.)

46-1575
Problem of determining the mathematical parameters of wind and glaze ice loads in mountain regions. [Problema opredeleniia raschetnykh parametrov vetrovykh i gololednykh nagruzok v gornykh raionakh].
Podrezov, O.A., Prikladnaia klimatologiia; sbornik trudov Vsesoiuznogo soveshchaniia po prikladnoi klimatologii, Leningrad, aprel' 1988 (Applied climatology; collected papers of the All-Union Conference on Applied Climatology, Leningrad, Apr. 1988). Edited by E.P. Borisenkov, I.D. Kopanev, and M.N. Mytarev, Leningrad, Gidrometeoizdat, 1990, p.102-114, In Russian. 2 refs.
Glaze, Ice loads, Wind factors, Analysis (mathematics), Ice accretion, Mathematical models.

46-1576
Climate and maritime management in the Soviet Arctic. [Klimat i morskoe khoziaistvo Sovetskoi Arktiki].
Girdiuk, G.V., et al, Prikladnaia klimatologiia; sbornik trudov Vsesoiuznogo soveshchaniia po prikladnoi klimatologii, Leningrad, aprel' 1988 (Applied climatology; collected papers of the All-Union Conference on Applied Climatology, Leningrad, Apr. 1988). Edited by E.P. Borisenkov, I.D. Kopanev, and M.N. Mytarev, Leningrad, Gidrometeoizdat, 1990, p.217-223, In Russian. 19 refs.
Dement'ev, A.A., Petrov, L.S.
Climatic factors, Economic development, Marine transportation, Icebreakers.

46-1577
Late Cenozoic glacial history of the Ross embayment, Antarctica.
Webb, P.N., et al, *Quaternary science reviews*, 1991, 10(2/3), p.215-223, Refs. p.221-223.
Harwood, D.M.
Paleoclimatology, Glacial geology, Geochronology, Glaciation, Ice models, Antarctica—Ross Sea, Antarctica—Transantarctic Mountains.
Knowledge of the Cenozoic terrestrial and marine glacial history of Antarctica has been developed through studies of on-land surface outcrops and subsurface drillcores; and through examination of drillcores and piston cores obtained from a variety of offshore marine geological settings. These field and laboratory endeavors have been a major target of the antarctic earth science community for more than thirty years. The Ross Sea sedimentary basins, including the Byrd basin, Wilkes and Pensacola basins, and the Transantarctic Mountains provide significant data on the Cenozoic glacial record; a record that has been traced back to at least 38 Ma (close to the Eocene-Oligocene boundary). This paper reviews the Late Cenozoic history of the Transantarctic Mountains and flanking sedimentary basins with emphasis on the debate between the 'stabilist' view of antarctic ice sheet history and the multi-glacial dynamic ice sheet model discussed. (Auth.)

46-1578
Deformation of marine ice as a source of the aerosol above it, as indicated by data obtained by the nuclear-powered icebreaker *Sibir'*.
Nagurnyĭ, A.P., *Akademiia nauk SSSR. Doklady. Earth science sections*, July 1991, 308(1-6), p.24-25. For Russian original see 44-1374.
Sea ice, Aerosols, Ice deformation, Visibility, Tidal currents, Particle size distribution.

46-1579
Variability in total ozone content in the northern circumpolar region, measured from the icebreaker *Sibir'* (May-June 1987).
Nagurnyĭ, A.P., et al, *Akademiia nauk SSSR. Doklady. Earth science sections*, July 1991, 308(1-6), p.54-58, 4 refs. For Russian original see 44-1758.
Shirochkov, A.V.
Polar atmospheres, Atmospheric composition, Ozone, Solar radiation, Measurement, Oceanographic surveys, Periodic variations.

46-1580
Chemical weathering of traprock materials under subarctic conditions.
Samoĭlov, A.G., *Akademiia nauk SSSR. Doklady. Earth science sections*, July 1991, 308(1-6), p.212-215, Translated from Akademiia nauk SSSR. Doklady, Vol.308, 1989. 4 refs.
Subpolar regions, Mining, Geochemistry, Rocks, Weathering, Soil formation, Tundra, Exploration.

46-1581
Recent variations in northern hemisphere snow cover.
Robinson, D.A., et al, *Annual Climate Diagnostics Workshop. Proceedings*, Mar. 1991, 15th, p.219-224, 4 refs.
Keimig, F.T., Dewey, K.F.
DLC QC980.C54a
Snow cover distribution, Periodic variations, Snow surveys, Climatic changes, Meteorological charts, Spaceborne photography.

46-1582
Improved SST analysis using sea ice data.
Marsico, D.C., et al, *Annual Climate Diagnostics Workshop. Proceedings*, Mar. 1991, 15th, p.247-252, 1 ref.
Reynolds, R.W.
DLC QC980.C54a
Sea ice, Oceans, Surface temperature, Ice cover effect, Remote sensing, Temperature measurement, Ice edge, Climatology.

46-1583
Climate variability of mountain snowpack in the central Rocky Mountains.
Changnon, D., et al, *Annual Climate Diagnostics Workshop. Proceedings*, Mar. 1991, 15th, p.384-389.
McKee, T.B., Doesken, N.J.
DLC QC980.C54a
Snow cover distribution, Climatic factors, Periodic variations, Atmospheric circulation, Synoptic meteorology, Wind direction.

46-1584
Application of local similarity method to nonsimilar conduction controlled freezing problems.
Aziz, A., et al, *International communications in heat and mass transfer*, Nov.-Dec. 1991, 18(6), MP 2980, p.813-822, 10 refs.
Lunardini, V.J.
Freezing, Analysis (mathematics), Phase transformations, Liquid solid interfaces, Heat transfer, Freezing front, Accuracy.
In this paper, the local method is used to solve three nonsimilar conduction controlled freezing problems. These are: (1) freezing of a semi-infinite medium with wall convection, (2) outward cylindrical freezing with constant wall temperature, and (3) freezing of a semi-infinite medium with time-dependent wall temperature. The local similarity solutions are compared to the heat balance integral, perturbation, coupled integral equation, and numerical solutions. The method is found to be accurate within a few percent.

46-1585
Development of a process oriented calibration scheme for the HBV hydrological model.
Harlin, J., *Nordic hydrology*, 1991, 22(1), p.15-36, 25 refs.
Runoff forecasting, Watersheds, Computerized simulation, Snowmelt, Hydrology, Soil water, Accuracy, Periodic variations, Flood forecasting.

46-1586
Watershed model using satellite data applied to a mountain basin in Canada.
Kite, G.W., *Journal of hydrology*, Nov. 1991, 128(1-4), p.157-169, 8 refs.
Watersheds, Runoff forecasting, Mathematical models, Snow hydrology, Spacecraft, Radiometry, Snow water equivalent, Data processing, LANDSAT.

46-1587
Properties of the radiothermal emission of a fresh water ice cover with a transition layer at the air-water boundary.
Bordonskiĭ, G.S., et al, *Akademiia nauk SSSR. Izvestiia. Atmospheric and oceanic physics*, Nov. 1989, 25(4), p.290-293, Translated from Izvestiia. Fizika atmosfery i okeana. 11 refs.
Krylov, S.C., Poliakov, S.V.
Lake ice, Microwaves, Ice water interface, Scattering, Ice cover effect, Radiometry, Ice cover thickness, Bubbles, Brightness, Limnology.

46-1588
Collected papers.
Paul Klieger Symposium on Performance of Concrete, San Diego, CA, Nov., 1989, Detroit, MI, American Concrete Institute, 1990, 499p., SP-122, Refs. passim.
For selected papers see 46-1589 through 46-1599.
Whiting, D., ed.
DLC TA440.P345 1989
Concrete durability, Freeze thaw tests, Cold weather performance, Cold weather tests, Air entrainment, Concrete admixtures, Frost resistance, Concrete structures, Concrete freezing, Frost protection, Temperature effects.

46-1589
How to make concrete that will be immune to the effects of freezing and thawing.
Mather, B., Paul Klieger Symposium on Performance of Concrete, San Diego, CA, Nov., 1989. SP-122, Detroit, MI, American Concrete Institute, 1990, p.1-13, 45 refs.
Concrete durability, Concrete aggregates, Freeze thaw tests, Air entrainment, Bubbles, Frost resistance, Concrete curing, Cold weather performance.

46-1590
Deicer salt scaling resistance of high performance concrete.
Gagne, R., et al, Paul Klieger Symposium on Performance of Concrete, San Diego, CA, Nov., 1989. SP-122, Detroit, MI, American Concrete Institute, 1990, p.29-44, 13 refs.
Pigeon, M., Aitcin, P.C.
Concrete admixtures, Concrete durability, Freeze thaw tests, Degradation, Air entrainment, Salting, Concrete curing, Cold weather tests.

46-1591
Freeze-thaw durability of concrete coated with linseed oil.
Rezansoff, T., et al, Paul Klieger Symposium on Performance of Concrete, San Diego, CA, Nov., 1989. SP-122, Detroit, MI, American Concrete Institute, 1990, p.61-80, 11 refs.
Stott, D.
Concrete durability, Freeze thaw tests, Protective coatings, Frost protection, Cold weather performance, Air entrainment.

46-1592
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46-1594
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46-1595
Field exposure of concrete to severe natural weathering.
Lamond, J.F., et al, Paul Klieger Symposium on Performance of Concrete, San Diego, CA, Nov., 1989. SP-122, Detroit, MI, American Concrete Institute, 1990, p.201-216, 16 refs.
Lee, M.K.
Concrete durability, Weathering, Cold weather tests, Frost resistance, Freeze thaw tests, Concrete freezing, Saturation, Sea water.

46-1596
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Concrete pavements, Concrete durability, Freeze thaw tests, Frost resistance, Concrete placing, Air entrainment, Cold weather performance, Deterioration.

46-1597
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46-1598
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Cooling towers, Shells, Concrete structures, Freeze thaw tests, Frost resistance, Damage, Countermeasures, Structural analysis, Protective coatings.

46-1599
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Docks, Concrete durability, Damage, Freeze thaw cycles, Maintenance, Cold weather performance, Structural analysis.

46-1600
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Ice mechanics, Ice breaking, Mathematical models, Cracking (fracturing), Ice solid interface, Floating ice, Offshore structures, Ice models, Brittleness.

46-1601
Results of solid precipitation measurement intercomparison in the alpine area of Urumqi River basin.
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Precipitation (meteorology), Snow accumulation, Precipitation gages, Measurement, Meteorological data, Wind factors, Accuracy, Snow fences, China Urumqi River.

46-1602
New, detailed ice-age oxygen-18 record from the ice-sheet margin in central West Greenland.
Reeh, N., et al, *Global and planetary change*, Oct. 1991, 4(4), p.373-383, 26 refs.
Ice sheets, Sampling, Isotope analysis, Paleoclimatology, Air temperature, Ice surface, Oxygen isotopes, Temperature variations, Climatic changes, Greenland.
A new detailed oxygen-18 record measured on surface-ice samples from a West Greenland ice-margin location reveals the hitherto longest climatic record from the Greenland ice sheet, spanning the last c. 150,000 years. The new record implies that the Greenland deep ice-core records from Dye3 and Camp Century need to be re-interpreted. A comparison with the deuterium record from the Vostok deep ice core in Antarctica indicates that climate behaved differently in the Northern and Southern Hemispheres during the last glacial/interglacial cycle, with major differences occurring in Emiliani isotopic stage 5. (Auth.)

46-1603
Greenland ice sheet through the last glacial-interglacial cycle.
Letréguilly, A., et al, *Global and planetary change*, Oct. 1991, 4(4), p.385-394, 37 refs.
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46-1604
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Hedlund, S.
Motor vehicles, Cold weather operation, Corrosion, Salting, Chemical ice prevention, Road icing.

46-1605
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Hallbrucker, A., et al, *Physics letters A*, Oct. 28, 1991, 159(8-9), p.406-410, 19 refs.
Amorphous ice, Low temperature research, Deuterium oxide ice, Molecular structure, Neutron diffraction, Hydrogen bonds, Ice physics, Scattering.

46-1606
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46-1607
Frozen solid. *AOPA pilot*, Mar. 1991, 34(3), p.94.
Aircraft icing, Safety, Meteorological data, Ice forecasting.

46-1608
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Gusev, E.M., et al, *Soviet soil science*, Nov. 1991, 23(5), p.93-101, Translated from Pochvovedenie, 1990, No.12. 9 refs.
Yasitskii, S.V.
Soil freezing, Mathematical models, Soil conservation, Covering, Thermal conductivity, Soil temperature, Frost penetration, Agriculture

46-1609
Small-angle neutron scattering studies of water and ice in porous Vycor glass.
Li, J.C., et al, *Journal of applied crystallography*, Oct. 1, 1991, 24(Pt.5), International Conference on Small-Angle Scattering, 8th, Leuven, Belgium, Aug 6-9, 1990. Proceedings. Edited by G. Kostorz et al, p.794-802, 24 refs.
Ross, D.K., Benham, M.J.
Ceramics, Porous materials, Liquid solid interfaces, Freeze thaw cycles, Water structure, Neutron scattering, Temperature effects, Density (mass volume)

46-1610
Arctic hurricane over the Bering Sea.
Businger, S., et al, *Monthly weather review*, Sep. 1991, 119(9), p.2293-2322, 57 refs. For another version see 45-1944.
Baik, J.J.
Atmospheric disturbances, Synoptic meteorology, Atmospheric circulation, Atmospheric pressure, Marine meteorology, Air ice water interaction, Heat flux, Mathematical models, Meteorological factors, Bering Sea.

46-1611
Mobile sounding observations of lake-effect snowbands in western and central New York.
Byrd, G.P., et al, *Monthly weather review*, Sep 1991, 19(9), p.2323-2332, 16 refs.
Anstett, R.A., Heim, J.E., Usinski, D.M.
Snowfall, Lake effects, Thermodynamics, Radio echo soundings, Meteorological factors, Boundary layer, Portable equipment, Weather forecasting.

46-1612
Adhesive shear strength of impact ice.
Chu, M.C., et al, *AIAA journal*, Nov. 1991, 29(11), p.1921-1926, 17 refs.
Scavuzzo, R.J.
Aircraft icing, Ice solid interface, Ice adhesion, Shear strength, Mechanical tests, Ice removal, Wind tunnels, Temperature effects.

46-1613
Numerical analysis of two-dimensional transient freezing in a spheroidal capsule.
Asako, Y., et al, *Journal of heat transfer*, Nov. 1991, 113(4), p.1017-1020, 5 refs.
Nakamura, H., Toyoda, S., Faghri, M.
Liquids, Spheres, Freezing, Heat transfer, Liquid solid interfaces, Analysis (mathematics), Cooling systems.

46-1614
Modelling of three-dimensional flexural oscillations of an ice cover induced by a moving load.
Bukatov, A.E., et al, *Soviet journal of physical oceanography*, 1991, 2(4), p.257-262, Translated from Morskoi gidrofizicheskii zhurnal. 11 refs.
Zharkov, V.V.
Floating ice, Flexural strength, Oscillations, Dynamic loads, Ice models, Ice water interface, Ice deformation, Ice mechanics.

46-1615
70 years of the Arctic and Antarctic Research Institute. (70 let Ordena Lenina Arkticheskomu i antarkticheskomu institutu).
Krutskikh, B.A., et al, *Problemy arktiki i antarktiki*, 1991, Vol.66, p.7-31, In Russian with English summary.
Nikiforov, E.G., Baskakov, G.A., Mustafin, N.V.
Organizations, Research projects.
This paper highlights the main stages of the institute's research activity in the area of physical geography ... meteorology of

the Arctic and Antarctica, oceanology and sea ice studies of the Arctic and southern oceans, river hydrology in the Siberian Arctic, geophysics of high latitudes (magnetosphere, ionosphere, radiowave propagation), sea-air interaction, ice and ocean physics, ice impact on a ship's hull, development and improvement of technical means to collect field hydrometeorological data in polar areas, polar medicine and human adaptation to life and work in extreme natural conditions, as well as other topics. The system that scientific hydrometeorological and geophysical information services use to meet the requirements of different branches of the economy in the Arctic, in particular, the navigation of ships along the Northern Sea Route and also to provide for the interests of the USSR in Antarctica, is described. Main directions of the research studies of the institute for the near future are indicated. (Auth. mod.)

46-1616

Basic results and prospects for oceanographic studies in the Arctic. [Osnovnye itogi i perspektivy okeanologicheskikh issledovanii v Arktike].
Baskakov, G.A., et al. *Problemy arktiki i antarktiki.* 1991, Vol.66, p.32-54, In Russian with English summary. 63 refs.
Research projects, Oceanography, Sea ice.

46-1617

Status and prospects of studies of ice and ocean physics. [Sostoianie i perspektivy issledovanii fizika l'da i okeana].
Bogorodskii, V.V., et al. *Problemy arktiki i antarktiki.* 1991, Vol.66, p.55-82, In Russian with English summary. 177 refs.
Snow optics, Ice physics, Sea ice, Ice mechanics, Snow acoustics, Ice acoustics, Underwater acoustics, Ice electrical properties, Research projects.

A brief analysis of hydrophysical and glaciological studies in polar areas (including Antarctica) carried out by the Department of Ice and Ocean Physics of the Arctic and Antarctic Research Institute is given. Data on the problem areas of ice physics and mechanics, acoustic and optical properties of ice, snow and water masses and related phenomena are presented. The possibilities for remote sensing radio-physical methods in oceanographic and ice studies are considered. (Auth. mod.)

46-1618

Ocean-atmosphere interaction in the northern polar region. [Vzaimodeistvie okeana i atmosfery v Severnoi poliarnoi oblasti].
Alekseev, G.V., et al. *Problemy arktiki i antarktiki.* 1991, Vol.66, p.83-103, In Russian with English summary. 61 refs.
Air water interactions, Air ice water interaction, Water temperature, Advection, Sea ice, Hydrothermal processes, Hydrodynamics, Models, Thermodynamics.

46-1619

Polar climatology in the modern epoch. [Poliarnaia klimatologiia v sovremennuiu epokhu].
Voskresenskii, A.I., *Problemy arktiki i antarktiki.* 1991, Vol.66, p.104-117, In Russian with English summary. 34 refs.
Climatology, Ozone, Ice cover effect, Snow cover effect.

Modern problems of polar climatology are analyzed. Advances in the formation of a concept of regional climate monitoring are shown. Reasons for the regular formation of a large negative anomaly of ozone over Antarctica in Oct. of 1980-1987 are explained. The problems of applied climatology as one of the key factors that decreases the net cost of products are considered. It is emphasized that management executives should promote meteorology and use the climatic information in industrial work. (Auth. mod.)

46-1620

Arctic water resources, state of the art, and immediate research problems. [Vodnye resursy Arktiki, ikh izuchennost' i ocherednye zadachi issledovanii].
Ivanov, V.V., et al. *Problemy arktiki i antarktiki.* 1991, Vol.66, p.118-128, In Russian with English summary. 28 refs.
[Ankina, V.A.
Water supply, Natural resources, Glacial hydrology, Rivers.

46-1621

Results of the development and application of numerical methods for ice calculations and forecasts for arctic seas. [Itogi razrabotki i primeneniia chislennykh metodov ledovykh raschetov i prognozov dlia arkticheskikh morei].
Appel', I.L., et al. *Problemy arktiki i antarktiki.* 1991, Vol.66, p.162-169, In Russian with English summary. 27 refs.
Gudkovich, Z.M., Frolov, I.E.
Mathematical models, Ice forecasting, Ice cover, Sea ice.

46-1622

Development and improvement of the system and methods of ice observations. [Razvitie i sovershenstvovanie sistemy i metodov ledovykh nabliudenii].
Bushuev, A.V., *Problemy arktiki i antarktiki.* 1991, Vol.66, p.170-183, In Russian with English summary. 9 refs.
Remote sensing, Ice surveys, Data processing, Ice conditions.

46-1623

Status and prospects for providing high-latitude arine expeditions with modern hydrometeorological instruments. [Sostoianie i perspektivy obespecheniia vysokoshirotnykh morskikh ekspeditsii sovremennoi gidrometeorologicheskoi tekhnikoi].
Kovchin, I.S., *Problemy arktiki i antarktiki,* 1991, Vol.66, p.184-195, In Russian with English summary. 12 refs.
Measuring instruments, Cold weather operation, Meteorological instruments, Precipitation gages.

46-1624

Improving the methods for strain measurement tests of ice navigating ships. [O sovershenstvovanii metodov tenzometricheskikh ispytanii sudov ledovogo plavaniia].
Likhomanov, V.A., et al, *Problemy arktiki i antarktiki.* 1991, Vol.66, p.196-204, In Russian with English summary. 4 refs.
Kuznetsov, M.V., Faddeev, O.V.
Ice navigation, Icebreakers, Strain tests, Ice solid interface, Design, Analysis (mathematics), Statistical analysis.

46-1625

Structure and hydrological typization of waters in the Arctic Basin. [Struktura i gidrologicheskaia tipizatsiia vod v Arkticheskom basseine].
Blinov, N.I., et al. *Problemy arktiki i antarktiki.* 1991, Vol.66, p.211-223, In Russian with English summary. 13 refs.
Nikiforov, E.G.
Hydrologic cycle, Water chemistry, Water structure, Salinity, Water temperature.

46-1626

Methods of estimating fresh water resources in arctic estuaries with closed-estuary coastal waters. [Metodika otsenki zapasov presnykh vod ust'evykh oblastiakh rek Arktiki s zakrytymi ust'evymi vzmor'iami].
Ivanov, V.V., *Problemy arktiki i antarktiki.* 1991, Vol.66, p.224-238, In Russian with English summary. 15 refs.
Water reserves, Natural resources, Estuaries, Water level, Water balance, Rivers, Sea water.

46-1627

Sea ice as an object of climatic studies. [Morskoi led kak ob"ekt klimaticheskikh issledovanii].
Zakharov, V.F., et al, *Problemy arktiki i antarktiki.* 1991, Vol.66, p.250-263, In Russian with English summary. 45 refs.
Makshtas, A.P., Romanov, A.A., Savchenko, V.G.
Sea ice, Air water interactions, Heat flux, Ice cover thickness, Climatology.

46-1628

Characteristics of the development of natural conditions in the Eurasian Arctic in the Late Pleistocene and Holocene. [Osobennosti razvitiia prirodnykh uslovii v Evraziiskoi Arktike v pozdnem pleistotsene i golotsene].
Korotkevich, E.S., et al, *Problemy arktiki i antarktiki.* 1991, Vol.66, p.264-288, In Russian with English summary. 61 refs.
Makeev, V.M.
Pleistocene, Landscape development, Glacial deposits, Global change, Glaciation.

46-1629

Stages of Late Pleistocene glaciation of Antarctica. [Etapy pozdnepleistotsenovogo oledeneniia Antarktidy].
Barkov, N.I., et al, *Problemy arktiki i antarktiki.* 1991, Vol.66, p.289-296, In Russian with English summary. 18 refs.
Korotkevich, E.S., Petrov, V.N.
Glacial geology, Ice sheets, Ice cores, Ice dating, Glaciation, Pleistocene.

Results from the analyses of the physical and chemical properties of an ice core taken from a depth of 2083 m at Vostok Station are used as the basic source of paleogeographic information. The period between 163 and 143 KA refers to the end of the penultimate Ice Age in the southern polar region called "the Ice Maximum Byrd II". In the Northern Hemisphere, according to the Alpine scale, this epoch corresponds to the Riss glaciation. The period between 120 and 13 KA is known as the Ice Age "Vostok," analogous to the Wurm glaciation in the Northern Hemisphere and includes 3 maxima of the glaciation as well as 2 interstadials. The period between 13 KA and the present time corresponds to the modern Holocene Interglacial called the "Modern Glaciation Minimum." (Auth. mod.)

46-1630

Results of the activities of the section on problems of the Earth's polar areas of the USSR Academy of Sciences Scientific Council on Problems of the Biosphere (1980-1989). [Itogi deiatel'nosti sektsii poliarnykh oblastei Zemli Nauchnogo soveta AN SSSR po problemam biosfery (1980-1989 gg.)].
Ivanov, V.V., et al. *Problemy arktiki i antarktiki.* 1991, Vol.66, p.297-307, In Russian with English summary.
Suziumova, G.N.
Organizations, Research projects, Economic development, Environmental protection.

46-1631

Alaskan Beaufort Sea coastal region. Alaska Clean Seas contingency planning manual supplement. Vol.1. Oil spill response considerations manual. Vol.2. Biological resources atlas.
Alaska Clean Seas, Anchorage, 1983, Var. p., Refs. passim.
Oil spills, Oil recovery, Ocean environments, Shores, Ecosystems, Environmental impact, Animals, Biogeography, United States--Alaska, Beaufort Sea.

46-1632

Guidelines for the planning and design of wastewater lagoon systems in cold climates.
Heinke, G.W., et al, *Canadian journal of civil engineering.* Aug. 1991, 18(4), p.556-567, With French summary. 29 refs.
Smith, D.W., Finch, G.R.
Waste treatment, Water treatment, Ponds, Cold weather operation, Design criteria, Sludges, Climatic factors, Ice cover effect, Structural analysis.

46-1633

Study of the freezing resistance of concrete containing superplasticizers. [Étude de la résistance au gel de bétons contenant un fluidifiant].
Pigeon, M., et al. *Canadian journal of civil engineering.* Aug. 1991, 18(4), p.581-589, In French with English summary. 19 refs.
Langlois, M.
Concrete durability, Concrete freezing, Frost resistance, Admixtures, Freeze thaw tests, Air entrainment, Cold weather performance, Physical properties.

46-1634

Updating hydrological model forecasts.
Assaf, H., et al, *Canadian journal of civil engineering.* Aug. 1991, 18(4), p.663-674, With French summary. 9 refs. For another version see 45-3804.
Quick, M.C.
Watersheds, Runoff forecasting, Snowmelt, Hydrology, Flow measurement, Mathematical models, Flood control.

46-1635

Pilot-scale studies of sludge dewatering in a freezing bed.
Martel, C.J., et al, *Canadian journal of civil engineering.* Aug. 1991, 18(4), MP 2981, p.681-689, With French summary. 14 refs. For another version see 45-3738.
Diener, C.J.
Waste treatment, Sludges, Structures, Design, Drying, Freeze thaw tests, Cold weather performance, Climatic factors, Meltwater.

In 1986, a pilot-scale sludge freezing bed was constructed at the U.S. Army Cold Regions Research and Engineering Laboratory in Hanover, NH, USA. This bed was operated for the next three years using both anaerobically and aerobically digested sludges. Results indicate that both sludges were effectively dewatered by this process. The maximum depth of sludge frozen during this study was 1.14 m. The final solid contents were 39.5% and 24.5% for anaerobically digested and aerobically digested sludges respectively. The quality of the meltwater from the bed was similar to raw wastewater. The actual depth of sludge frozen and thawed in the bed during each year of operation was very close to that predicted by design models. Operational experience demonstrated the importance of a sand layer at the bottom of the bed for adequate drainage. Also, odors developed when the meltwater was allowed to accumulate in the bed. Odors were not a problem when the meltwater was drained away as quickly as it formed. Both sludges were easily removed with a front-end loader.

46-1636

Millimeter wave technique for measuring ice thickness on the space shuttle's external tank.
Kendra, J.E., et al, *International journal of infrared and millimeter waves.* Dec. 1991, 12(12), p.1349-1377, 6 refs.
Ulaby, F.T., Wu, S.
Spacecraft, Tanks (containers), Ice formation, Ice accretion, Radiometry, Ice forecasting, Imaging, Panels, Dielectric properties.

46-1637
Reconstruction of the paleoclimate of the Late Pleistocene and Holocene on the basis of isotope studies of subsurface ice and waters of the permafrost zone.
Vasil'chuk, IU.K., *Water resources*, Sep. 1991, 17(6), p.640-647, Translated from Vodnye resursy, 1990, No.6. 14 refs.
Paleoclimatology, Ground ice, Ice wedges, Isotope analysis, Permafrost distribution, Subsurface investigations, Sampling, Pleistocene.

46-1638
Stefan problem solved via conjugate gradient-like methods on a parallel vector machine.
Chronopoulos, A.T., et al, *International journal of supercomputer applications*, 1991, 5(3), p.74-91, 26 refs.
Swaminathan, C.R., Voller, V.R.
Stefan problem, Computer applications, Computerized simulation.

46-1639
Simultaneous measurements of the charge, size, and shape of hydrometeors in an electrified cloud.
Weinheimer, A.J., et al, *Journal of geophysical research*, Nov. 20, 1991, 96(D11), p.20,809-20,829, 55 refs.
Cloud electrification, Precipitation (meteorology), Snow pellets, Charge transfer, Thunderstorms, Aerial surveys, Charge measuring instruments, Particle size distribution.

46-1640
Heterogeneous reactions of chlorine nitrate and hydrogen chloride on type I polar stratospheric clouds.
Leu, M.T., et al, *Journal of physical chemistry*, Oct. 3, 1991, 95(20), p.7763-7771, 28 refs.
Moore, S.B., Keyser, L.F.
Ozone, Cloud physics, Ice vapor interface, Stratosphere, Chemical analysis, Polar atmospheres, Substrates, Simulation.

46-1641
Microstructure of entrained air voids in concrete—part 1.
Rashed, A.I., et al, *Journal of materials research*, Sep. 1991, 6(9), p.2004-2012, 12 refs.
Williamson, R.B.
Concrete admixtures, Concrete durability, Solidification, Scanning electron microscopy, Frost resistance, Air entrainment, Microstructure, Bubbles.

46-1642
Microstructure of entrained air voids in concrete—part 2.
Rashed, A.I., et al, *Journal of materials research*, Nov. 1991, 6(11), p.2474-2483, 17 refs.
Williamson, R.B.
Concrete durability, Concrete admixtures, Solidification, Frost resistance, Microstructure, Air entrainment, Scanning electron microscopy, Structural analysis, Mechanical properties.

46-1643
Chemistry of alpine lakes in Aosta Valley (N. Italy) in relation to watershed characteristics and acid deposition.
Mosell, R., et al, *Ambio*, Feb. 1991, 20(1), p.7-12, 24 refs.
Lake water, Water pollution, Chemical properties, Watersheds, Snow composition, Snowmelt, Weathering, Sampling, Limnology, Air pollution.

46-1644
Numerical experiments of the structures of atmospheric electrical elements during a snowfall near a building.
Asuma, Y., et al, *Reseach letters on atmospheric electricity*, July 1988, 8(1), p.1-8, 13 refs.
Kikuchi, K.
Atmospheric electricity, Buildings, Snowfall, Charge transfer, Electric fields, Atmospheric physics, Polarization (charge separation).

46-1645
Role of radiation geometry in the climate response of Mount Kenya's glaciers—part 3: the latitude effect.
Kruss, P.D., et al, *International journal of climatology*, Apr. 1990, 10(3), p.321-328, 2 refs.
Hastenrath, S.
Glacier mass balance, Insolation, Mountain glaciers, Climatic factors, Glacier oscillation, Topographic effects, Altitude, Slope orientation, Kenya—Kenya, Mount.

46-1646
Summer snowfalls over the Mount Olympus area.
Sahsamanoglou, H.S., *International journal of climatology*, May-June 1989, 9(3), p.309-319, 10 refs.
Precipitation (meteorology), Snowfall, Synoptic meteorology, Atmospheric circulation, Air temperature, Statistical analysis, Meteorological data, Greece—Olympus, Mount.

46-1647
Surface energy exchange model of glacier melt and net mass balance.
Munro, D.S., *International journal of climatology*, Sep.-Oct. 1991, 11(6), p.689-700, 38 refs.
Glacier mass balance, Glacier melting, Surface energy, Radiation balance, Climatic changes, Meltwater, Simulation, Glacial hydrology, Climatic factors.

46-1648
Evolution of snow-size spectra in cyclonic storms. Part 2: deviations from the exponential form.
Mitchell, D.L., *Journal of the atmospheric sciences*, Aug. 15, 1991, 48(16), p.1885-1899, 18 refs.
Precipitation (meteorology), Snowstorms, Snow crystal growth, Spectra, Particle size distribution, Clouds (meteorology), Mathematical models, Vapor diffusion.

46-1649
Eigenstates of a quantum-mechanical particle on a topologically disordered surface: H(D) atom physisorbed on an amorphous ice cluster (H2O)115.
Buch, V., et al, *Journal of chemical physics*, Oct. 15, 1991, 95(8), p.6026-6038, 17 refs.
Czerminski, R.
Ice physics, Amorphous ice, Adsorption, Surface structure, Molecular energy levels, Extraterrestrial ice, Thermodynamics.

46-1650
Coastal ice and sediment samples; shoreface and ice profiles; (southern Lake Michigan, February, December 1989, and February, April 1990).
McCormick, M., et al, *U.S. Geological Survey. Open-file report*, 1990, No.90-537, 196p., 22 refs.
Fast ice, Shoreline modification, Ice rafting, Ice surveys, Lake ice, Sediment transport, Ice conditions, Water level, Pressure ridges, United States—Michigan, Lake.

46-1651
Design and performance of road pavements.
Croney, D., et al, London, McGraw-Hill, 1991, 592p. (Pertinent p.146-156), Refs. passim.
Croney, P.
Pavements, Frost heave, Road maintenance.

46-1652
Calculating the thermal regime of alluvial structures using electro-thawing in early spring. [Raschet temperaturnogo rezhima namyvnykh sooruzhenii s primeneniem elektroottaivaniia v rannii vesennii period].
Dziubenko, L.F., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo i arkhitektura*, May 1991, No.5, p.58-64, In Russian. 6 refs.
Artificial thawing, Frozen ground mechanics, Alluvium, Frozen ground temperature, Thermal regime, Ground thawing, Analysis (mathematics).

46-1653
Calculating the temperature field of ground covered with thermal insulating materials. [Raschet temperaturnogo polia gruntov, ukrytykh teploizoliruiushchimi materialami].
Migliachenko, V.P., *Izvestiia vysshikh uchebnykh zavedenii. Stroitel'stvo i arkhitektura*, May 1991, No.5, p.111-115, In Russian. 2 refs.
Thermal insulation, Frozen ground thermodynamics, Analysis (mathematics), Temperature distribution, Frozen ground temperature.

46-1654
Gravel drift and wind effects on the macrotidal San Sebastian Bay, Tierra del Fuego, Argentina.
Isla, F.I., et al, *Marine geology*, Mar. 1991, 97(1/2), p.211-224, 20 refs.
Shoreline modification, Wind erosion, Tides, Gravel, Tierra del Fuego.
In northeastern Tierra del Fuego, the Holocene mean sea-level (MSL) fluctuation reworked much pre-Wisconsin glacial drift into sand-gravel beaches and spits, and sand-mud tidal flats. For the last 7000 years, sea level has been falling. A southwards wave-induced longshore transport of sand and gravel has constructed the 17 km long El Páramo spit, which partly encloses the wide San Sebastián Bay. Semidiurnal tides with a range of up to 10 m enter the bay from the south, causing a dominance of flood currents and wave action in the southern part of the bay; ebb currents predominate in the north. This segregation of flows conditioned sedimentation and is thus responsible for the south-north transition of welded gravel ridges, sand flats, mixed flats and mud flats. Wind and wave actions from Atlantic storms infilled the southern coast of the bay, fossil and active marshes evolved, and seasonal ponds have been produced by intense deflation. On the intertidal mud flats, wind causes deflation during neap tides and silting during spring tides. North of the bay, the eastward migration of straight tidal channels or rills is conditioned by winds. The effects of strong and persistent winds from the Pacific influence not only the tidal flats, but also the gravel spit. If ocean waves induce a southward drift of gravels within the bay, the wind-induced gravel drift is to the north. During winter there are no aeolian effects over the iced tidal flats. (Auth. mod.)

46-1655
Ethylene and ethane evolution during cold acclimation and deacclimation of ponderosa pine.
Burr, K.E., et al, *Canadian journal of forest research*, May 1991, 21(5), p.601-605, With French summary. 34 refs.
Wallner, S.J., Tinus, R.W.
Acclimatization, Plant physiology, Cold tolerance, Cold stress, Trees (plants), Cryobiology.

46-1656
Distribution and development processes of sea-ice algal communities.
Hoshiai, T., *Korean journal of polar research*, June 1991, 2(1) (Special issue), Second International Symposium on Antarctic Science, Seoul, Korea, Sep. 17-18, 1990. [Proceedings], p.3-8, 25 refs.
Sea ice, Algae, Biomass.
Information on the distribution and developmental processes of ice algal communities in the Antarctic is reviewed. Although efforts were made in ecological research of ice algae, data acquired were insufficient to make realistic estimation of biomass and primary productivity of ice algae in the antarctic ocean. The need for synoptic observations on distribution and developmental processes of ice algal communities is pointed out.

46-1657
Population structure of krill (*Euphausia superba* Dana) near sea-ice zone between Elephant Island and South Orkney Islands (December 1988-January 1989).
Kittel, W., et al, *Korean journal of polar research*, June 1991, 2(1) (Special issue), Second International Symposium on Antarctic Science, Seoul, Korea, Sep. 17-18, 1990. [Proceedings], p.29-35, 13 refs.
Sicinski, J.
Marine biology, Ice cover effect, Antarctica—South Orkney Islands, Antarctica—Elephant Island.
The effect of the sea-ice zone on the abundance, distribution and population structure of krill in three regions has been investigated: near Elephant I., near South Orkney Is. and in the region in between. Based on the analysis of the krill population structure, these three regions can be clearly distinguished. Mature krill were dominant in the Elephant I. and the South Orkney Is. regions. In the middle region, krill were smaller and juveniles dominated. Small but statistically significant differences in mean krill body length between the populations of the open ocean and of the pack ice were observed. (Auth.)

46-1658
High resolution seismic record of antarctic glacial history.
Anderson, J.B., et al, *Korean journal of polar research*, June 1991, 2(1) (Special issue), Second International Symposium on Antarctic Science, Seoul, Korea, Sep. 17-18, 1990. [Proceedings], p.71-78, 16 refs.
Bartek, L.R.
Seismic surveys, Ice sheets, Glacial geology, Antarctica—Ross Sea, Antarctica—Antarctic Peninsula.
The results of two high resolution seismic surveys, one in the Ross Sea and one on the northern Antarctic Peninsula shelf (including the Bransfield Basin), are presented. This work focuses on the identification of surfaces and sedimentary packages unique to these glacial settings, such features as glacial troughs, till tongues, and subglacial deltas. Examples of these features occur in both regions, and their stratigraphic occurrence aids in the reconstruction of the glacial history of the study areas. The Ross Sea is the only area in West Antarctica where drill site information provides constraints to the seismic stratigraphy. Results of this study indicate that ice sheets grounded on the continental shelf as early as late Oligocene. The Antarctic Peninsula continental shelf also has experienced several episodes of ice sheet grounding, but the timing of glacial events remains poorly constrained. (Auth. mod.)

46-1659
Flow diagnostics in a cryogenic wind tunnel.
Borisov, S.IU., et al, *Journal of applied mechanics and technical physics*, Nov. 1991(Pub. May-June 91), 32(3), p.461-463, Translated from Zhurnal prikladnoi mekhaniki i tekhnicheskoi fiziki. 4 refs.
Iskra, A.L., Kulesh, V.P., Naumov, A.M.
Wind tunnels, Cryogenic structures, Air flow, Low temperature tests, Design, Hoarfrost, Carbon dioxide.

46-1660
Growth characteristics of willows during the recultivation of technogenic landscapes in the Far North. [Osobennosti rosta iv pri rekul'tivatsii tekhnogennykh landshaftov Krainego Severa].
Masalkin, S.D., et al, *Stroitel'stvo truboprovodov*, July 1991, No.7, p.20-22, In Russian.
Laburdov, E.A.
Trees (plants), Revegetation, Active layer.

46-1661
Using small-diameter pipes in bundles for developing condensed gas deposits in the Far North. [Primenenie trub malogo diametra v buntakh dlia obustroistva gazokondensatnykh mestorozhdenii Krainego Severa].
Zorin, E.E., et al, *Stroitel'stvo truboprovodov*, July 1991, No.7, p.35-37, In Russian.
Gas pipelines, Gas production, Cold weather construction, Cold weather performance.

46-1662
Two-stage construction of second embankments on sagging permafrost bases. [Dvukhetapnoe sooruzhenie nasypei vtorykh putei na prosadochnykh vechnomerzlykh osnovaniiakh].
Ivanov, M.I., et al, *Transportnoe stroitel'stvo*, May 1991, No.5, p.7-8, In Russian. 3 refs.
Timofeev, G.I.
Permafrost beneath structures, Embankments, Cold weather construction, Frozen ground settling.

46-1663
Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years.
Starkel, L., ed, Chichester, England, John Wiley & Sons, 1991, 548p., For selected papers see 46-1664 through 46-1677.
Gregory, K.J., ed, Thornes, J.B., ed.
Hydrology, Paleoclimatology, Periglacial processes, Rivers, Sediments, Glacial deposits, Glacial rivers, Quaternary deposits, Geomorphology, Meltwater, Valleys, Snowmelt, Glacial lakes, Isostasy, Pleistocene, Correlation.

46-1664
Characteristics of the temperate zone and fluvial palaeohydrology.
Starkel, L., Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.3-12, 57 refs.
Hydrology, Periglacial processes, Glaciation, Rivers.

46-1665
Hydrology of rivers and river regimes.
Sundborg, A., et al, Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.13-29, 31 refs.
Jansson, M.
Hydrology, Rivers, Sediments, Glacial deposits, Meltwater, Glacial rivers.

46-1666
Morphology and sediments: typological characteristics of fluvial forms and deposits.
Gregory, K.J., et al, Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.31-59, Refs. p.53-59.
Maizels, J.K.
Channels (waterways), Streams, Sediments, Quaternary deposits, Glacial deposits, Snowmelt.

46-1667
Glacio-isostatically adjusted palaeohydrology, the rivers Ivalojoki and Oulankajoki, northern Finland.
Koutaniemi, L., Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.65-78, 16 refs.
Isostasy, Glacial rivers, Hydrology, Landforms, Periglacial processes, Finland Ivalojoki River, Finland—Oulankajoki River.

46-1668
Regional case studies in southern Finland with reference to glacial rebound and Baltic regression.
Mansikkaniemi, H., Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.79-104, 44 refs.
Rivers, River basins, Glacial deposits, Valleys, Moraines, Flooding.

46-1669
Palaeohydrological change during deglaciation in upland Britain: a case study from northeast Scotland.
Maizels, J.K., et al, Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.105-145, Refs. p.140-145.
Aitken, J.
Hydrology, Glacial deposits, Glacier melting, Runoff, Mathematical models, Terraces, Meltwater, Snowmelt, Ice melting.

46-1670
Vistula River valley: a case study for central Europe.
Starkel, L., Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.171-188, Refs. p.186-188.
Valleys, Ice cover, Glacial lakes, Glacial rivers, Correlation, Poland—Vistula River.

46-1671
Palaeohydrological development in the southern Netherlands during the last 15,000 years.
Bohncke, S.J.P., et al, Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.253-281, Refs. p.279-281.
Vandenberghe, J.
Humidity, Hydrology, Geomorphology, Climate, Pollen, Vegetation, Pleistocene, Paleoclimatology, Lakes, Models, Ice cover.

46-1672
History of the Aare River and the forealpine lakes in western Switzerland.
Wohlfarth, B., et al, Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.301-318, Refs. p.315-318.
Ammann, B.
Pleistocene, Paleoclimatology, Glaciers, Glacial lakes, Glacial rivers, Switzerland—Aare River.

46-1673
Evolution of the river systems in the east Baltic.
Miidel, A., et al, Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.365-380, 35 refs.
Raukas, A.
Valleys, Rivers, Glacial lakes, Isostasy.

46-1674
Fluvial history of West Siberia.
Astakhov, V.I., Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.381-392, 16 refs.
Rivers, Pleistocene, Drainage, Paleoclimatology, Ice cover, Glaciation.

46-1675
Glacier fluctuations in Scandinavia during the last 9,000 years.
Karlén, W., Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.395-412, Refs. p.410-412.
Glacier oscillation, Radioactive age determination, Glacier surveys.

46-1676
Palaeogeography of limestone areas.
Ložek, V., Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.413-429, 33 refs.
Paleoclimatology, Quaternary deposits, Glacial deposits, Pleistocene.

46-1677
Long-distance correlation of fluvial events in the temperate zone.
Starkel, L., Temperate palaeohydrology; fluvial processes in the temperate zone during the last 15,000 years. Edited by L. Starkel, K.J. Gregory, and J.B. Thornes, Chichester, England, John Wiley & Sons, 1991, p.473-495, Refs. p.491-495.
Correlation, Paleoclimatology, Glacial rivers, Periglacial processes, Hydrology, Climatic changes, Valleys, Geomorphology, Models.

46-1678
Arctic research of the United States, Vol.5.
U.S. Interagency Arctic Research Policy Committee, MP 2982, Washington, D.C., Fall 1991, 78p., Refs. passim.
Myers, C.E., ed, Bowen, S., ed, Cate, D.W., ed, Valliere, D.R., ed.
Research projects, Organizations, Legislation, International cooperation, Meetings.

46-1679
Coordinated Eastern Arctic Experiment: a progress report.
Williams, R.G., et al, Arctic research of the United States, Vol.5, Washington, D.C., Fall 1991, p.4-13, 18 refs.
Curtin, T.B., Fondrk, J.
Oceanographic surveys, Ocean currents, Ice water interface, Research projects, Drift, Sea ice, Underwater acoustics.

46-1680
Ecological problems of transportation construction under northern conditions. [Ekologicheskie voprosy transportnogo stroitel'stva v usloviiakh Severa].
Ivanov, M.I., et al, *Transportnoe stroitel'stvo*, July 1991, No.7, p.17-19, In Russian. 2 refs.
Lukashuk, L.V., Musatova, M.M., Timofeev, G.I.
Cold weather construction, Environmental impact, Environmental protection.

46-1681
Improving the frost resistance of concrete in the construction of pedestrian bridges. [Povysit' morozostoikost' betona dlia konstruktsii peshekhodynkh mostov].
Rozental', N.K., et al, *Transportnoe stroitel'stvo*, July 1991, No.7, p.26-27, In Russian.
Chekhnii, G.V., Goriachev, S.I.
Frost resistance, Bridges, Concrete freezing, Concretes, Concrete admixtures.

46-1682
Effectiveness of the construction of a railway bed for second tracks on permafrost. [Ob effektivnosti stroitel'stva zemlianogo polotna dlia vtorykh glavnykh putei na vechnomerzlykh gruntakh].
Timofeev, G.I., *Transportnoe stroitel'stvo*, June 1991, No.6, p.16-17, In Russian. 5 refs.
Railroad tracks, Subgrades, Permafrost beneath roads.

46-1683
Electric heating of frozen ground. [Elektroprogrev merzlogo grunta].
Bogomol'nyi, M.B., *Transportnoe stroitel'stvo*, June 1991, No.6, p.37-38, In Russian.
Electric heating, Frozen ground thermodynamics, Ground thawing, Artificial thawing.

46-1684
Terminal environment, topographic control and fluctuations of West Greenland glaciers.
Warren, C.R., *Boreas*, Mar. 1, 1991, 20(1), p.1-15, 40 refs.
Glacier oscillation, Climatic factors, Calving, Glacier surveys, Greenland.

46-1685
Jura glaciers: palaeogeography in the Würmian circum-Alpine zone.
Campy, M., et al, *Boreas*, Mar. 1, 1991, 20(1), p.17-27, 28 refs.
Arn, R.
Mountain glaciers, Alpine glaciation, Origin, Moraines, Glacial deposits, Stratigraphy.

46-1686
Saalian sediments of the Belchatów outcrop, central Poland.
Krzyszkowski, D., *Boreas*, Mar. 1, 1991, 20(1), p.29-46, Refs. p.44-46.
Glacial deposits, Stratigraphy, Sediments, Quaternary deposits, Poland—Belchatów.

46-1687
Iceberg scours, iceberg gravity craters and current erosion marks from a gigantic Preboreal flood in southeastern Norway.
Longva, O., et al, *Boreas*, Mar. 1, 1991, 20(1), p.47-62, 17 refs.
Thoresen, M.K.
Icebergs, Ice scoring, Flooding, Icebound lakes, Water erosion, Norway.

46-1688
Younger Dryas in southern South America?.
Markgraf, V., *Boreas*, Mar. 1, 1991, 20(1), p.63-69, 40 refs.
Paleoclimatology, Pollen, Glaciers.
Two high resolution pollen records, Caunahue from mid-latitudes and Harberton from high latitudes, illustrate the issues in defining the Younger Dryas episode in records from southern South America. At mid-latitudes in the Chilean lake region,

previous claims for the existence of a substantially cooler and wetter episode between 11,000 and 10,000 BP can no longer be supported by new pollen records with high temporal and paleoenvironmental resolution, such as Caunahue. The transition from glacial to interglacial conditions occurred in several steps, one shortly after 13,000 BP, when open *Nothofagus* woodland was replaced by cool-temperate North Patagonian forest, and one at 9,500 BP, when warm-temperate Valdivian forest elements replaced the North Patagonian elements. At high latitudes, on the other hand, high resolution records do show marked short-term changes during the late-glacial, including the 11,000 to 10,000 BP interval. However, neither the exact timing nor the duration of these changes is synchronous for specific taxa, neither within one record nor between different records. One of the two intervals of low pollen influx that has been singled out as evidence for a cooler episode is consistently dated between 11,000 and 12,000 BP, while the other interval dates between 10,800 and 9,000 BP. Based on all this information the author concludes that there is no evidence of a Younger Dryas episode for the mid-latitudes. For the high latitudes, on the other hand, the overall high paleoenvironmental variability in the records offers multiple choices for a Younger Dryas-type interval if specific taxa are selected without considering the overall context. However, the lack of synchroneity between short-term changes of specific taxa between different records suggests primarily a response to local disturbances, rather than a response to a global forcing. In conclusion, in the high latitudes, the different systems' paleoclimatic signals are all related to Antarctica and its forcing, and unrelated to the circum-North Atlantic Younger Dryas forcing. (Auth. mod.)

46-1689
'On glaciers in general and particular...': the life and works of an Icelandic pioneer in glacial research.
Ingólfsson, Ó., *Boreas*, Mar. 1, 1991, 20(1), p.79-84, 5 refs.
History, Glaciers.

46-1690
Role of radiation geometry in the climate response of Mount Kenya's glaciers, part 2: sloping versus horizontal surfaces.
Hastenrath, S., et al, *Journal of climatology*, Nov.-Dec. 1988, 8(6), p.629-639, 5 refs.
Kruss, P.D.
Mountain glaciers, Glacier mass balance, Glacier ablation, Climatic factors, Insolation, Topographic effects, Slope orientation, Radiation balance, Seasonal variations, Kenya—Kenya, Mount.

46-1691
Welded structures for low service temperature to -60 deg C.
Kálna, K., et al, *Welding research abroad*, Oct. 1991, 37(10), p.21-30, Extracted from Zvŕačské správy, 1990, No.4. 11 refs.
Blecha, A.
Welding, Low temperature research, Steels, Steel structures, Fatigue (materials), Cold weather performance, Temperature effects, Joints (junctions), Design criteria.

46-1692
Possible impacts of climatic warming scenarios on water resources in the Saskatchewan River sub-basin, Canada.
Cohen, S.J., *Climatic change*, Oct. 1991, 19(3), p.291-317, Refs. p.315-317.
River basins, Runoff, Climatic changes, Global warming, Water balance, Precipitation (meteorology), Models, Water reserves, Snowmelt, Canada—Saskatchewan.

46-1693
Consideration of the mirror image effect based on ion production during snowfall and rainfall.
Orikasa, K., *Research letters on atmospheric electricity*, Dec. 1987, 7(2), p.35-44, 6 refs.
Snowfall, Precipitation (meteorology), Electric fields, Ion density (concentration), Snow electrical properties, Atmospheric electricity, Polarization (charge separation).

46-1694
Experience in operating pipelines of a hydraulic ash removal system in winter under extreme weather conditions.
Panteleev, V.G., et al, *Advances in Soviet power systems—part 1: thermal and mechanical*, 1990, No.2, p.11-16, Translated from Elektricheskie stantsii, 1990, No.3. 9 refs.
Sokolova, A.A., Potapov, I.A., Shcherbakov, A.B.
Electric power, Coal, Waste disposal, Suspended pipelines, Pipeline freezing, Sludges, Cold weather operation, Design.

46-1695
Rejection and capture of solid particles by ice.
Yemmou, M., et al, *Advances in space research*, 1991, 11(7), COSPAR Plenary Meeting, 28th, Symposium 11, the Hague, Netherlands, June 25-July 6, 1990. Proceedings. Microgravity research: material and fluid sciences. Edited by H.U. Walter et al, p.(7)327-(7)330, 8 refs.
Brierre, A., Azouni, M.A.
Synthetic materials, Ice water interface, Particles, Freezing front, Gravity, Solidification, Solutions, Velocity measurement, Bubbles.

46-1696
Raman microprobe spectroscopy of icing on metal surfaces.
Sonwalkar, N., et al, *Journal of Raman spectroscopy*, Oct. 1991, 22(10), p.551-557, 34 refs.
Shyam Sunder, S., Sharma, S.K.
Ice spectroscopy, Ice solid interface, Ice formation, Metals, Substrates, Spectra, Low temperature tests, Surface structure, Probes.

46-1697
Method and results of evaluating probability of breakage of overhead line wires by icing.
D'iakov, A.F., et al, *Advances in Soviet power systems—part 2: electrical generation and distribution*, 1990, No.6, p.34-40, Translated from Elektricheskie stantsii, 1990, No.12. 7 refs.
Fedosenko, R.IA.
Power line icing, Power line supports, Damage, Forecasting, Computerized simulation, Ice loads, Design criteria, Structural analysis.

46-1698
Preliminary study of coupled oxidation-reduction reactions of included ions in growing ice crystals.
Finnegan, W.G., et al, *Atmospheric environment*, 1991, 25A(11), Symposium on Global Climatic Effects of Aerosols, Reno-Sparks, NV, Oct. 11-13, 1989. Edited by J.P. Lodge, Jr., p.2531-2534, 15 refs.
Pitter, R.L., Young, L.G.
Cloud physics, Supercooled clouds, Ice crystal growth, Chemical composition, Ion exchange, Ice water interface, Simulation, Atmospheric composition, Ozone.

46-1699
Heterogeneous chemistry on polar stratospheric clouds.
Molina, M.J., *Atmospheric environment*, 1991, 25A(11), Symposium on Global Climatic effects of Aerosols, Reno-Sparks, NV, Oct. 11-13, 1989. Edited by J.P. Lodge, Jr., p.2535-2537, 21 refs.
Polar atmospheres, Photochemical reactions, Ozone, Atmospheric composition, Stratosphere, Degradation, Clouds (meteorology), Chemical properties, Ice water interface.
Polar stratospheric clouds play a crucial role in the depletion of stratospheric ozone over Antarctica in the spring months. The cloud particles promote the conversion of the inert chlorine reservoirs HCl and ClONO2 to Cl2, which is photolytically active. Furthermore, the clouds lead to the removal of nitric acid and nitrogen oxides from the gas phase, facilitating the destruction of ozone by catalytic cycles involving chlorine free radicals. This paper discusses possible heterogeneous chemical reactions involved in stratospheric ozone depletion. (Auth. mod.)

46-1700
Theoretical determination of the collection rates of aerosol particles by falling ice crystal plates and columns.
Miller, N.L., et al, *Atmospheric environment*, 1991, 25A(11), Symposium on Global Climatic Effects of Aerosols, Reno-Sparks, NV, Oct. 11-13, 1989. Edited by J.P. Lodge, Jr., p.2593-2606, 33 refs.
Wang, P.K.
Aerosols, Precipitation (meteorology), Ice crystals, Scavenging, Atmospheric composition, Mathematical models, Temperature effects, Particle size distribution.

46-1701
Zone of optimal rheological properties of road asphalts. [Zone der optimalen rheologischen Eigenschaften des Strassenbaubitumens].
Sybilski, D., *Bitumen*, Feb. 1991, 53(2), p.73-77, In German. 4 refs.
Bitumens, Rheology, Low temperature tests, Nomographs.

46-1702
Surveying and designing airports: a manual. [Izyskaniia i proektirovanie aerodromov: spravochnik].
Glushkov, G.I., ed, Moscow, Transport, 1990, 295p., In Russian. 10 refs.
Airports, Frozen ground strength, Frozen ground thermodynamics, Design, Ground thawing, Permafrost bases, Freeze thaw cycles, Analysis (mathematics), Thaw depth.

46-1703
Special earth excavation machinery and equipment for urban construction. [Spetsial'nye zemleroinye mashiny i mekhanizmy dlia gorodskogo stroitel'stva].
Poltavtsev, I.S., et al, Kiev, Budivel'nykh, 1977, 135p., In Russian. 24 refs.
Orlov, V.B., Liakhovich, I.F.
Machinery, Construction equipment, Design, Cold weather construction, Frozen ground mechanics, Analysis (mathematics).

46-1704
Proceedings.
Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990, *Annals of glaciology*, 1991, Vol.15, 282p., Refs. passim. For individual papers see 46-1705 through 46-1744 or F-45346 through F-45353.
Ice water interface, Ice mechanics, Sea ice, Drift, Ice models, Ice deformation, Ice pressure, Ice cover strength, Sea ice distribution, Ice loads.
Of the 40 papers presented in this volume, 8 are pertinent to Antarctica and cover the following subjects: ice drift, texture and growth in the Weddell Sea; collision of ice floes under wave action; flow stripes on the Ross Ice Shelf; ocean, atmosphere and sea ice interaction; and sea ice observations from the drifting M.V. *Nella Dan* in the spring of 1985.

46-1705
Ice-ocean dynamics and mechanics: a summary of the papers.
Hutter, K., *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.1-8, 1 ref.
Ice water interface, Ice mechanics, Sea ice, Meetings, Ice models.

46-1706
Sea-ice dynamics in the Weddell Sea in winter.
Hoeber, H., *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.9-16, 9 refs.
Air ice water interaction, Drift, Ice mechanics, Sea ice, Drift stations, Winter, Antarctica—Weddell Sea.
Observations of ice drift received from an array of ARGOS buoys drifting in the Weddell Sea in winter 1986 are described. Wind and current data are also available, permitting derivation of the complete momentum budget including the internal ice stress computed as residuum. It is shown that the variability of forcing both of the atmosphere and of the ocean is large, and that internal ice stress is not negligible; monthly vector averages amount to about half of the wind and water stresses. Coefficients of shear and bulk viscosity are derived according to Hibler's model of ice rheology; they turn out to be negative occasionally, in particular when small-scale forcing of the atmosphere is large. (Auth.)

46-1707
On the effect of rheology on seasonal sea-ice simulations.
Ip, C.F., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.17-25, 10 refs.
Hibler, W.D., III, Flato, G.M.
Ice water interface, Drift, Ice mechanics, Rheology, Sea ice, Seasonal variations, Ice models, Mathematical models.

46-1708
Numerical simulations of a compact convergent system of ice floes.
Hopkins, M.A., et al, *Annals of glaciology*, 1991, Vol.15, MP 3110, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.26-30, 7 refs.
Hibler, W.D., III.
Ice floes, Ice deformation, Drift, Ice mechanics, Pack ice, Ice friction, Ice models, Mathematical models.

46-1709
Initial numerical investigation of the extent of sea-ice ridging.
Flato, G.M., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.31-36, 11 refs.
Hibler, W.D., III.
Pressure ridges, Ice deformation, Ice cover thickness, Drift, Ice models, Mathematical models, Ice cover strength.

46-1710
On the role of ocean circulation in seasonal and interannual ice-edge variations in the Bering Sea.
Zhang, J.L., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.37-44, 12 refs.
Hibler, W.D., III.
Sea ice distribution, Ice edge, Ocean currents, Drift, Ice water interface, Seasonal variations, Ice models, Bering Sea.

46-1711
Seasonal arctic sea-ice simulations with a prognostic ice-ocean model.
Ranelli, P.H., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.45-53, 10 refs.
Hibler, W.D., III.
Ocean currents, Ice water interface, Sea ice distribution, Drift, Salinity, Ice models.

46-1712
Synoptic and seasonal variations of the ice-ocean circulation in the Arctic: a numerical study.
Warn-Varnas, A., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.54-62, 19 refs.
Allard, R., Piacsek, S.
Ocean currents, Drift, Ice water interface, Sea ice distribution, Ice models.

46-1713
Sea-ice mechanical energy balance: nearshore Chukchi Sea, 1982.
Pritchard, R.S., *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.63-72, 15 refs.
Air ice water interaction, Ice mechanics, Drift, Sea ice, Wind factors, Ocean currents, Mathematical models, Chukchi Sea.

46-1714
Propagation of characteristics in sea-ice deformation fields.
Erlingsson, B., *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.73-80, 9 refs.
Ice deformation, Ice friction, Ice mechanics, Internal friction, Sea ice, Ice openings, Pressure ridges, Analysis (mathematics).

46-1715
On the ridging of a thin sheet of lead ice.
Hopkins, M.A., et al, *Annals of glaciology*, 1991, Vol.15, MP 3111, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.81-86, 9 refs.
Hibler, W.D., III.
Pressure ridges, Ice deformation, Ice openings, Sea ice, Mathematical models, Ice models, Ice floes.

46-1716
One-dimensional model for wave-induced ice-floe collisions.
Shen, H.H., et al, *Annals of glaciology*, 1991, Vol.15, MP 2983, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.87-95, 7 refs.
Ackley, S.F.
Ice floes, Ice mechanics, Drift, Ice water interface, Ocean waves, Ice growth, Ice models, Mathematical models, Wave propagation.
From observations made in the 1986 Winter Weddell Sea Project, the characteristics of ice floes and the formation process are described. The collision of ice floes under the action of a monotonic wave is quantified. The lateral motion of an ice floe caused by the wave is modeled as the sliding of an object under gravity. Drag and added mass effects are included in the model. Two floes located at different positions are shown to have a net difference in their drift (caused only by repeated wave passages). In most cases, this differential drift eventually causes floe collision. When two floes collide, a spring and dash-pot model is adopted to calculate the contact force. A one-dimensional wave passing through a one-dimensional array of disc-shaped floes is examined. Two phenomena are apparent from the analysis: waves have a herding effect that forms bands of floes with the width equal to the wavelength, and the frequency of collision is sensitive to the elastic properties of the floes and the wave amplitude. The floes stay in contact for prolonged periods, indicating the potential to freeze together and form composite floes, as was observed in the field studies (Auth. mod.)

46-1717
Role of incoming waves in ice-edge dynamics.
Squire, V.A., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.96-100, 15 refs.
Fox, C.
Ice edge, Ice water interface, Ocean waves, Ice mechanics, Wave propagation, Ice cover strength, Ice loads, Ice models, Mathematical models.

46-1718
Coupling between the ocean and an ice shelf.
Fox, C., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.101-108, 10 refs.
Squire, V.A.
Ice shelves, Ice water interface, Ice mechanics, Ocean waves, Wave propagation, Ice cover strength, Ice models, Mathematical models.

46-1719
Transient sub-surface uplift of a floating ice sheet.
Dempsey, J.P., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.109-114, 9 refs.
Zhao, Z.G.
Ice cover strength, Ice bottom surface, Ice water interface, Ice breaking, Ice loads, Submarines, Subglacial navigation, Ice models, Mathematical models.

46-1720
Relationship between tidewater glacier calving velocity and water depth at the calving front.
Pelto, M.S., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.115-118, 15 refs.
Warren, C.R.
Calving, Ice water interface, Water level, Glacier flow.

46-1721
Sedimentary processes may cause fluctuations of tidewater glaciers.
Alley, R.B., *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.119-124, 13 refs.
Calving, Ice water interface, Glacier flow, Sediment transport, Moraines, Bottom sediment, Glacier mass balance, Glacier oscillation, Mathematical models.

46-1722
Massive, ancient sea-ice strata and preserved physical-structural characteristics in the Ward Hunt Ice Shelf.
Jeffries, M.O., *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.125-131, 21 refs.
Ice shelves, Ice cores, Sea ice, Ice dating, Ice crystal structure, Ice salinity, Canada - Northwest Territories - Ellesmere Island.

46-1723
Relict flow stripes on the Ross Ice Shelf.
Casassa, G., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.132-138, 21 refs.
Jezek, K.C., Turner, J., Whillans, I.M.
Ice shelves, Radiometry, Glacier flow, Ice sheets, Spaceborne photography, Glacier surfaces, Topographic features, Antarctica - Ross Ice Shelf.
Analysis of AVHRR data collected during the summer and winter over the Ross Ice Shelf reveals complex patterns of curvilinear stripes. In particular, a large, looping pattern of stripes is observed west of Crary Ice Rise in an area where conventional glaciological data collected with surface and airborne methods have been interpreted to suggest uncomplicated flow. On the basis of previous work using radar data to study ice flow downstream of Crary Ice Rise, it is concluded that the stripes represent relict flowlines. The mechanism that produces these stripes is unclear, but it is hypothesized that they are associated with subtle topography. Based solely on the patterns of stripes and their location in the outflow of major ice streams, it is proposed that they are related to an ice raft torn from the grounded ice sheet about 400 km upstream from its present position. (Auth.)

46-1724
Mesoscale eddy formation and evolution in the ice-covered ocean.
Ikeda, M., *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.139-147, 21 refs.
Ocean currents, Ice water interface, Drift, Ice edge, Bottom topography, Sea ice distribution.

46-1725
Quasi-analytical model for the under-ice boundary layer.
McPhee, M.G., *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug 26-31, 1990. Proceedings, p.148-154, 13 refs.
Ice water interface, Ice bottom surface, Turbulent boundary layer, Drift, Heat transfer, Mass transfer, Ice models, Mathematical models.

46-1726
Interannual characteristics of an 80 km resolution diagnostic arctic ice-ocean model.
Ries, J.E., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.155-162, 5 refs.
Hibler, W.D., III.
Ice edge, Sea ice distribution, Drift, Ice water interface, Ocean currents, Ice models, Seasonal variations.

46-1727
Estimates of ice-edge melt rates off Labrador and eastern Newfoundland, Canada.
Prinsenberg, S.J., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug 26-31, 1990. Proceedings, p.163-170, 5 refs.
Peterson, I.K., Fowler, G.A.
Ice edge, Drift, Sea ice distribution, Ice water interface, Ice cover thickness, Ice melting, Labrador Sea.

46-1728
Oceanographic and meteorological effects on autumn sea-ice distribution in the western Arctic.
Muench, R.D., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.171-177, 16 refs.
Pease, C.H., Salo, S.A.
Sea ice distribution, Ice edge, Drift, Ice water interface, Wind factors, Ocean currents, Seasonal variations.

46-1729
Energy flux density estimation over sea ice based on satellite passive microwave measurements.
Steffen, K., *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.178-183, 17 refs.
Ice air interface, Radiometry, Ice heat flux, Sea ice distribution, Ice surveys, Ice cover thickness, Polynyas, Spaceborne photography, Young ice, Baffin Bay.

46-1730
Ocean-atmosphere energy exchange over thin, variable concentration antarctic pack ice.
Worby, A.P., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.184-190, 22 refs.
Allison, I.
Air ice water interaction, Pack ice, Ice heat flux, Ice cover thickness, Sea ice distribution, Ice models, Mathematical models, Antarctica.
Several recent studies have suggested that much of the wintertime antarctic ice is thin (< 0.3 m). The presence of extensive areas of thin ice has a significant effect on ocean-atmosphere energy exchange. This is investigated using the Maykut (1978) thin-ice energy budget model in a study for typical Sep antarctic ice and climatic conditions. In this one-dimensional sensitivity study, a constant floe size is assumed, and ice concentration variations are simulated by changing the width of the leads between floes. The modelled results, for the floe size considered, indicate that at 80% ice concentration the turbulent heat loss through the thin ice component can be greater than that from leads. As concentration decreases, however, the fractional loss through the ice, and hence the ice-thickness distribution, becomes less significant. For concentrations lower than 50%, there is little change in turbulent loss with further decrease in ice cover, as the atmosphere effectively "sees" open ocean. (Auth. mod.)

46-1731
Application of an atmospheric boundary layer model to a large-scale coupled sea-ice—oceanic mixed-layer model for the southern ocean.
Stössel, A., *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.191-195, 15 refs.
Air ice water interaction, Sea ice distribution, Ice cover thickness, Ice heat flux, Ice edge, Drift, Ice models, Antarctica.
A coupled sea-ice - oceanic mixed-layer model for the southern ocean is forced with daily atmospheric variables from the global analyses of the European Center for Medium Range Weather Forecasts (ECMWF). In order to avoid a predetermination of the simulated sea-ice conditions from the (climatological) specification of the surface boundary conditions in the atmo-

spheric general circulation model (AGCM), the sea-ice model is coupled additionally to a one-dimensional atmospheric boundary layer model. The results are rather poor, in that the ice extent as well as the ice velocities are generally too low and that the ice thickness distribution resembles the results of a pure thermodynamic sea-ice model. The results with the forcing from the higher level are more realistic when snow and mixed-layer effects are neglected. This indicates that the parameterizations in the atmospheric boundary layer model have to be readjusted in order to interact realistically with the snow-sea ice-oceanic mixed-layer model. It is suggested that the pattern of the wind field, whether from the geostrophic or the surface level, has a significant influence on the sea ice model results. (Auth. mod.)

46-1732
Physical basis for a dynamic antarctic sea-ice model for use with an atmospheric GCM.
Budd, W.F., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.196-203, 23 refs.
Simmonds, I., Wu, X.R.
Air ice water interaction, Drift, Sea ice distribution, Ice cover thickness, Ice heat flux, Atmospheric circulation, Ice models, Mathematical models, Antarctica.
An observed ocean-drift data set is used as the basis of a wind-driven coupled ocean-sea ice-atmosphere model including interaction and feedback. The observed characteristics of the antarctic sea ice are described, including the ice thickness, ice concentration and horizontal advection. The atmospheric model computes heat fluxes, sea ice growth, changes in concentration and advection. Sensitivity studies show reasonable and stable simulations of the observed sea ice characteristics for the present mean antarctic winter climate. The response times and feedbacks of the ice-atmosphere system as represented by the model appear to allow scope for the development of some persistence of anomalies. (Auth.)

46-1733
Image analysis of sea-ice thin sections: a step towards automated texture classification.
Eicken, H., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.204-209, 7 refs.
Lange, M.A.
Sea ice, Ice structure, Ice optics, Computer applications, Thin sections, Statistical analysis, Grain size.

46-1734
Textural characteristics of sea ice and the major mechanisms of ice growth in the Weddell Sea.
Lange, M.A., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.210-215, 15 refs.
Eicken, H.
Sea ice, Ice structure, Ice growth, Frazil ice, Sea water freezing, Ice formation, Ice deformation, Antarctica - Weddell Sea.
Studies of sea ice texture conducted during a number of expeditions into the Weddell Sea are discussed, showing that the sea ice in the Antarctic is dominated by granular ice of frazil origin in floes of all ages, in contrast to ice in the Arctic, which consists predominantly of columnar ice of congelation origin. The large fraction of granular ice in first-year sea ice is a result of the dominant ice-formation process in the advancing ice edge, the pancake cycle. The dominance of granular over columnar ice in second- and/or multi-year ice is a result of the large degree of deformational activity in the southern ocean. (Auth.)

46-1735
Effect of confinement on the brittle compressive fracture of ice.
Schulson, E.M., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.216-221, 20 refs.
Jones, D.E., Kuehn, G.A.
Ice deformation, Ice strength, Ice pressure, Ice loads, Ice cracks, Cracking (fracturing), Ice friction, Analysis (mathematics).

46-1736
Microcrack nucleation in granular ice under uniaxial compression: effect of grain-size and temperature.
Kalifa, P., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.222-229, 23 refs.
Jones, S.J., Slade, T.D.
Ice deformation, Ice cracks, Ice pressure, Crack propagation, Ice strength, Ice microstructure, Ice loads, Analysis (mathematics).

46-1737
Notch-acuity effects on the fracture toughness of saline ice.
DeFranco, S.J., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.230-235, 15 refs.
Wei, Y., Dempsey, J.P.
Salt ice, Ice strength, Ice deformation, Ice cracks, Ice loads, Crack propagation.

46-1738
Fatigue-crack growth in fresh-water ice: preliminary results.
Nixon, W.A., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.236-241, 21 refs.
Weber, L.J.
Ice strength, Ice deformation, Ice cracks, Crack propagation, Ice loads, Fatigue (materials).

46-1739
Kinetic friction of saline ice against itself at low sliding velocities.
Jones, D.E., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.242-246, 9 refs.
Kennedy, F.E., Schulson, E.M.
Salt ice, Ice friction, Ice creep, Ice deformation.

46-1740
Energy exchanges during indentation tests in fresh-water ice.
Sodhi, D.S., *Annals of glaciology*, 1991, Vol.15, MP 2984, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.247-253, 10 refs.
Ice solid interface, Ice deformation, Ice loads, Ice pressure, Offshore structures, Ice cover strength, Vibration, Impact tests.
The data from a small-scale experimental study on ice-structure interaction are used to compute the energy exchanges that take place during creep deformation and intermittent and continuous crushing of ice. The energy supplied by the carriage is partly stored in the structural spring, partly dissipated as heat in the damping mechanisms of the structure. Except for the heat dissipation, all other forms of energy were computed from the experimental data, and the heat dissipation was computed from the energy balance using the first law of thermodynamics. Plots of all forms of energy are shown in graphical form, in which their relative magnitudes, times of occurrence and interplay can be seen. The main result of this study is the thesis that intermittent crushing or ice-induced vibration takes place whenever there is an imbalance between the rates of work done by the carriage and the indentor, and that there are no vibrations when these rates of work are equal.

46-1741
Evidence for pressure melting and heat generation by viscous flow of liquid in indentation and impact experiments on ice.
Gagnon, R.E., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.254-260, 16 refs.
Mölgaard, J.
Ice solid interface, Ice pressure, Ice strength, Ice loads, Ice deformation, Ice friction, Regelation.

46-1742
Antarctic field study of the rheology and movement of a sea-ice floe aggregate.
Jacka, T.H., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.261-264, 7 refs.
Thwaites, R., Wilson, J.C.
Ice floes, Drift, Sea ice distribution, Ice navigation, Ships, Rheology, Ice mechanics.
M.V. *Nella Dan* was beset in ice near 66S, 51E from Oct. 27 to Dec. 15, 1985. The scientific investigations in the sea-ice zone included ice thickness, concentration and extent measurements, aerial photography of the ice, a core drilling project, meteorological observations, repeat measurements of a small strain grid and measurements of the sea-ice drift rate. Analysis of measurements of the strain grid area over an 11 d period shows that, although there is some indication that the ice field may have been divergent, opening by approximately 3.4% over this period, there are large errors in the measurements and some doubt must be placed on the reliability of this estimate. The drift speed and direction were found to be highly dependent on wind speed and direction, the drift rate being approximately 2.7% of the wind speed at an angle of about 29 deg to the left of the wind direction. (Auth. mod.)

46-1743
On the relationship between local stresses and strains in arctic pack ice.
Tucker, W.B., et al, *Annals of glaciology*, 1991, Vol.15, MP 2985, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.265-270, 15 refs.
Perovich, D.K., Hopkins, M.A., Hibler, W.D., III
Pack ice, Drift, Ice pressure, Ice cover strength, Ice deformation, Ice navigation, Ice loads, Pressure ridges, Norway - Spitsbergen.
Local ice strains and *in situ* ice stresses were simultaneously measured on the Coordinated Eastern Arctic Experiment (CEAREX). The experiment took place in the fall of 1988 and was centered about an ice-strengthened ship moored to a first-year floe in the pack ice northeast of Spitsbergen. Stress sensors were placed at four sites, two sites on each of two adjacent multi-year floes. Principal stress components and the principal stress direction were determined at each sensor. At the same time, microwave transponders capable of measuring ice deformation to accuracies of better than 1 m were positioned within 1 km of the stress sensors and provided an approximation of the local strain field. What makes this joint data set particularly interesting is that it includes some large ridging events, including a particularly large event which terminated the experiment when the multi-year floes in the local area were broken into small fragments. A wide range of ice stresses was measured during the period. The largest compressive stresses, about 250 kPa, were measured by the near surface sensors. Although sensors in different locations responded differently to ice movement, the large events were common to all shallow sensors.

46-1744
Ridge-sail statistics at the shear edge of Lancaster Sound, March 1984.
Sayed, M., et al, *Annals of glaciology*, 1991, Vol.15, Symposium on Ice-Ocean Dynamics and Mechanics, Hanover, NH, Aug. 26-31, 1990. Proceedings, p.271-275, 10 refs.
Frederking, R.M.W.
Pressure ridges, Ice cover thickness, Fast ice, Ice surveys, Ice surface, Ice edge, Statistical analysis, Canada - Northwest Territories - Lancaster Sound.

46-1745
Nutrient status in sea ice of the Weddell Sea during winter: effects of sea ice texture and algae.
Dieckmann, G.S., et al, *Polar biology*, Dec. 1991, 11(7), MP 2986, p.449-456, Refs. p.455-456.
Lange, M.A., Ackley, S.F., Jennings, J.C., Jr.
Sea ice, Ice composition, Biomass, Algae, Ice salinity, Salt water, Antarctica - Weddell Sea.
Cores and brine samples from sea ice of the Weddell Sea were analyzed for nutrients (phosphate, nitrate and silicate), salinity and chlorophyll *a* during winter. Stratigraphic analyses of the cores were also carried out. Bulk nutrient concentrations in the sea ice fluctuated widely and did not correlate with salinity; they varied between zero and two or three times those measured in the water column. Differentiation into young and old sea ice, however, revealed that nutrient concentrations in the young sea ice in many cases correspond to those in surface seawater. In older ice, nutrients showed signs of increase as well as depletion or exhaustion relative to the water column. Most of the changes in the nutrient concentrations are attributed to an increase in biological activity as the seasons progress. Silicate is expected to become the first nutrient likely to limit growth of diatoms in the ice, which is ascribed to slower regeneration or dissolution of this nutrient relative to phosphate and nitrate. A consequence of silicate exhaustion may be the succession of different algal assemblages, from a diatom-dominated community to one in which autotrophic flagellates form the largest component. (Auth. mod.)

46-1746
Finite element simulation of behavior of laterally loaded piles in permafrost—discussion and closure.
Morin, P., et al, *Journal of geotechnical engineering*, Jan. 1992, 118(1), p.171-185, 7 refs. For article being discussed see 44-2402.
Foriero, A., Ladanyi, B.
Piles, Loading, Soil creep, Frozen ground mechanics, Permafrost beneath structures, Foundations, Elastic properties, Analysis (mathematics).

46-1747
Review of the physical oceanography of Fram Strait.
Hunkins, K.L., NATO Advanced Research Workshop on the Physical Oceanography of Sea Straits, Les Arcs, France, July 5-9, 1989. Proceedings. Physical oceanography of sea straits. Edited by L.J. Pratt. Dordrecht, Netherlands, Kluwer Academic Publishers, 1990, p.61-93, NATO ASI Series C, Volume 318, Refs. p.91-93.
DLC GC99.P47 1990
Oceanography, Ice cover effect, Drift, Ocean currents, Climatic factors, Convection, Sea ice distribution, Salinity, Marine atmospheres, Fram Strait.

46-1748
Effect of temperature on the luminescence from electron-irradiated H2O ice.
Quickenden, T.I., et al. *Journal of chemical physics*, Dec. 15, 1991, 95(12), p.8843-8852, 54 refs.
Ice physics, Temperature effects, Radiation absorption, Ionization, Luminescence, Chemical analysis, Ice structure, Low temperature research.

46-1749
Mathematic representations of sea ice dynamic-thermodynamic processes.
Wu, H.D., *Oceanologia et limnologia sinica*, July 1991, 22(4), p.321-328, In Chinese with English summary. 8 refs.
Sea ice, Ice heat flux, Air ice water interaction, Ice mechanics, Drift, Ice models, Mathematical models.

46-1750
NASA sea ice validation program for the Defense Meteorological Satellite Program special sensor microwave imager.
Cavalieri, D.J., *Journal of geophysical research*, Dec. 15, 1991, 96(C12), p.21,969-21,970, 8 refs. For another version see 44-3849.
Sea ice distribution, Ice surveys, Ice reporting, Ice conditions, Remote sensing, Spaceborne photography, Radiometry.

46-1751
NASA team algorithm for sea ice concentration retrieval from Defense Meteorological Satellite Program special sensor microwave imager: comparison with Landsat satellite imagery.
Steffen, K., et al, *Journal of geophysical research*, Dec. 15, 1991, 96(C12), p.21,971-21,987, 24 refs.
Schweiger, A.J.
Sea ice distribution, Ice surveys, Ice edge, Ice conditions, Ice reporting, LANDSAT, Spaceborne photography, Remote sensing, Ice models, Radiometry, Beaufort Sea, Antarctica, Weddell Sea, Bering Sea, Antarctica, Amundsen Sea.
Validation of the NASA team algorithm for the determination of sea ice concentrations from the Defense Meteorological Satellite Program special sensor microwave imager (SSM/I) is described. A total of 28 cloud-free Landsat scenes were selected in order to permit validation of the passive microwave ice concentration algorithm for a range of ice concentrations and ice types. The sensitivity of the NASA team algorithm to the selection of locally and seasonally adjusted algorithm parameters is discussed in detail. Mean absolute differences between SSM/I and Landsat ice concentrations are within 1% during fall, using local and global tie points. Standard deviations of the difference are +/-3.1% and +/-6.2% respectively. The overall accuracy of the NASA team algorithm is lower in spring than in fall. In areas with greater amounts of nilas and young ice, it is found that the NASA team algorithm underestimates ice concentrations by as much as 9%. In summer, mean differences between SSM/I and Landsat ice concentrations are 7.2% for local tie points and 11.7% for global tie points for antarctic areas. It is suggested that the standard deviation between SSM/I and Landsat ice concentrations decreases from +/-7% to +/-5% with local tie points compared to global ones for spring and fall. (Auth. mod.)

46-1752
Aircraft active and passive microwave validation of sea ice concentration from the Defense Meteorological Satellite Program special sensor microwave imager.
Cavaheri, D.J., et al, *Journal of geophysical research*, Dec. 15, 1991, 96(C12), p.21,989-22,008, 32 refs.
Sea ice distribution, Ice surveys, Ice conditions, Ice edge, Spaceborne photography, Aerial surveys, Remote sensing, Ice models, Radiometry, Bering Sea, Chukchi Sea, Beaufort Sea.

46-1753
Model of the formation of high-salinity shelf water on polar continental shelves.
Grumbine, R.W., *Journal of geophysical research*, Dec. 15, 1991, 96(C12), p.22,049-22,062, 39 refs.
Sea water freezing, Ocean currents, Salinity, Water transport, Water chemistry, Mathematical models, Polynyas, Antarctica, Weddell Sea, Antarctica, Ross Sea.
A model of the flow and salinity fields forced by sea surface salinity flux and wind stress curl is developed and used to examine the processes that create High-Salinity Shelf Water (HSSW). The flow field is the sum of the barotropic geostrophic flow driven by salinity variations and a barotropic geostrophic flow driven by wind stress curl. The salinity field is controlled by advection, convection, and sea surface salinity flux associated with sea ice formation. The model domain represents the Weddell Sea or Ross Sea continental shelf without topography. Linear damping is seen to control the magnitude of the circulation, while the polynya freezing rate controlled the extent of salt rejection to the shelf water. The flux of HSSW is linear with respect to the polynya freezing rate. The modelled flux of HSSW and the flux of formed Bottom Water for present estimates of the forcings agree with the fluxes inferred from physical and chemical observations in the deep Weddell Sea by oceanographic field programs. The modelled flux of Bottom Water for the Ross Sea also agrees with observations. (Auth. mod.)

46-1754
Comparison of sea ice parameters computed from advanced very high resolution radiometer and Landsat satellite imagery and from airborne passive microwave radiometry.
Emery, W.J., et al, *Journal of geophysical research*, Dec. 15, 1991, 96(C12), p.22,075-22,085, 13 refs.
Radiometry, Sea ice distribution, Ice edge, Ice surveys, Ice conditions, Remote sensing, Aerial surveys, Spaceborne photography, Bering Sea.

46-1755
On the use of lognormal statistics to simulate one- and two-dimensional under-ice draft profiles.
Hughes, B.A., *Journal of geophysical research*, Dec. 15, 1991, 96(C12), p.22,101-22,111, 14 refs.
Subglacial observations, Ice bottom surface, Ice cover thickness, Underwater acoustics, Ice acoustics, Statistical analysis, Ice models.

46-1756
Retention of Greenland runoff by refreezing: implications for projected sea level change.
Pfeffer, W.T., et al, *Journal of geophysical research*, Dec. 15, 1991, 96(C12), p.22,117-22,124, 17 refs.
Meier, M.F., Illangasekare, T.H.
Water retention, Ice (water storage), Sea level, Meltwater, Glacier melting, Glacier mass balance, Runoff forecasting, Global change, Greenland.

46-1757
Dew point vs. frost point measurements.
Cooper, F.G., *Sensors*, Oct. 1991, 8(11), p.26-29.
Freezing points, Optical phenomena, Dew point, Sensors, Hygrometers, Accuracy, Manufacturing, Liquid phases.

46-1758
Hygrometry in the real world.
Buck, A.L., *Sensors*, Oct. 1991, 8(11), p.30-33.
Freezing points, Optical phenomena, Dew point, Accuracy, Hygrometers, Sensors, Vapor pressure, Temperature effects.

46-1759
Saline outflow from the Arctic Ocean: its contribution to the deep waters of the Greenland, Norwegian, and Iceland Seas.
Aagaard, K., et al, *Journal of geophysical research*, Nov. 15, 1991, 96(C11), p.20,433-20,441, 15 refs.
Fahrbach, E., Meincke, J., Swift, J.H.
Ocean currents, Hydrography, Salinity, Convection, Water temperature, Oceanography, Arctic Ocean.

46-1760
One-dimensional model of ice shelf-ocean interaction.
Jenkins, A., *Journal of geophysical research*, Nov. 15, 1991, 96(C11), p.20,671-20,677, 38 refs.
Ice shelves, Glacier mass balance, Ice water interface, Ocean currents, Subsurface investigations, Glacier ablation, Mathematical models, Salinity, Water temperature, Antarctica, Ronne Ice Shelf.
Large-scale oceanic circulation beneath antarctic ice shelves is driven by the thermohaline differences which result from mass and energy exchange at the ice-ocean interface. Dense saline waters are drawn underneath the ice shelves and emerge, cooled and diluted, as plumes of Ice Shelf Water. A simple one-dimensional model of this process has been developed, in which the Ice Shelf Water plume is treated as a turbulent gravity current, initiated at the inland margin by a flow of fresh meltwater emerging from beneath the grounded ice. Subsequent evolution of the plume as it ascends along an ice shelf base of specified geometry can be simulated. The model has been applied to a flow line on Ronne Ice Shelf to explain the observed distribution and rate of basal melting and freezing. Calculations indicate that at the present mean melt rate of 0.6 m/y would increase to 2.6 m/y if the underlying water were to warm by 0.6 C. This would not only lead to significant thinning of the ice shelf, but could also cause a profound change in ocean circulation on the open continental shelf. (Auth. mod.)

46-1761
Multifrequency polarimetric synthetic aperture radar observations of sea ice.
Drinkwater, M.R., et al, *Journal of geophysical research*, Nov. 15, 1991, 96(C11), p.20,679-20,698, 45 refs.
Kwok, R., Winebrenner, D.P., Rignot, E.
Sea ice, Ice conditions, Classifications, Synthetic aperture radar, Spaceborne photography, Resolution, Geophysical surveys, Polarization (waves), Imaging.

46-1762
Overcoming biases of precipitation measurement: a history of the USSR experience.
Groisman, P.IA., et al, *American Meteorological Society Bulletin*, Nov. 1991, 72(11), p.1725-1733, 20 refs.
Koknaeva, V.V., Belokrylova, T.A., Karl, T.R.
Precipitation (meteorology), Sampling, Measurement, Accuracy, Precipitation gages, Climatic changes, Wind factors, Periodic variations, Meteorological data.

46-1763
Sliding of a body over a melting surface at a high velocity.
Pushkarev, O.E., *Journal of engineering physics*, Dec. 1991, 60(6), p.740-744, Translated from Inzhenerno-fizicheskii zhurnal, June 1991. 5 refs.
Sliding, Films, Liquid solid interfaces, Ice melting, Heat flux, Mathematical models, Surface temperature.

46-1764
Mathematical model of frost growth on a single cylinder in steady crossflow.
Monaghan, P.F., et al, International Heat Transfer Conference, 9th, Jerusalem, Israel, Aug. 19-24, 1990, Proceedings, Volume 3. Edited by G. Hetsroni et al, New York, NY, Hemisphere Publishing Corporation, 1990, p.115-120, 18 refs.
Oosthuizen, P.H.
DLC QC319.8.I57 1990
Ice growth, Hoarfrost, Pipes (tubes), Ice solid interface, Frost forecasting, Heat transfer, Mathematical models, Air flow, Vapor diffusion.

46-1765
Graetz problem with maximum density effects in convectively cooled horizontal water pipes—heat transfer characteristics preceding the onset of ice formation.
Cheng, K.C., et al, International Heat Transfer Conference, 9th, Jerusalem, Israel, Aug. 19-24, 1990, Proceedings, Volume 3. Edited by G. Hetsroni et al, New York, NY, Hemisphere Publishing Corporation, 1990, p.321-326, 23 refs.
Ou, J.W.
DLC QC319.8.I57 1990
Water pipes, Ice formation, Laminar flow, Heat transfer, Liquid solid interfaces, Pipeline freezing, Cooling rate, Analysis (mathematics).

46-1766
Effect of pipe diameter and pressure drop on the formation of ice plugs in pipelines.
Bowen, R.J., et al, International Heat Transfer Conference, 9th, Jerusalem, Israel, Aug. 19-24, 1990, Proceedings, Volume 4. Edited by G. Hetsroni et al, New York, NY, Hemisphere Publishing Corporation, 1990, p.295-299, 6 refs.
Burton, M.J., Smith, G.S.
DLC QC319.8.I57 1990
Water pipes, Ice formation, Pipeline freezing, Water temperature, Maintenance, Cryogenics, Heat transfer, Temperature effects, Laminar flow.

46-1767
Evaluation of a mathematical model for heat transfer and frost growth on an outdoor row of vertical cylinders.
Monaghan, P.F., et al, International Heat Transfer Conference, 9th, Jerusalem, Israel, Aug. 19-24, 1990, Proceedings, Volume 4. Edited by G. Hetsroni et al, New York, NY, Hemisphere Publishing Corporation, 1990, p.301-306, 12 refs.
Oosthuizen, P.H.
DLC QC319.8.I57 1990
Pipes (tubes), Ice growth, Hoarfrost, Heat transfer, Mathematical models, Ice solid interface, Frost forecasting.

46-1768
Mixed convection solidification in a vertical channel.
Campbell, J.S., et al, International Heat Transfer Conference, 9th, Jerusalem, Israel, Aug. 19-24, 1990, Proceedings, Volume 4. Edited by G. Hetsroni et al, New York, NY, Hemisphere Publishing Corporation, 1990, p.311-316, 4 refs.
Incropera, F.P.
DLC QC319.8.I57 1990
Water flow, Laminar flow, Solidification, Liquid solid interfaces, Buoyancy, Convection, Heat transfer, Temperature effects, Boundary layer.

46-1769
Heat transfer in snow thickness.
Zvtagin, V.V., et al. International Heat Transfer Conference, 9th, Jerusalem, Israel, Aug. 19-24, 1990. Proceedings. Volume 5. Edited by G. Hetsroni et al. New York, NY, Hemisphere Publishing Corporation, 1990, p.491-495, 3 refs.
Shreiber, I.R.
DLC QC319.8.I57 1990
Snow cover effect, Snow thermal properties, Snow depth, Snow temperature, Thermal conductivity, Heat transfer, Temperature variations, Wind factors.

46-1770
Digital impulse radar for glaciology: instrumentation, modelling, and field studies.
Jones, E.H.M., Vancouver, University of British Columbia, Nov. 1987, 110p., M.S. thesis. 57 refs.
Radio echo soundings, Glacier surveys, Glacier beds, Glacier thickness, Electromagnetic prospecting, Subglacial observations, Ice electrical properties, Analysis (mathematics).

46-1771
Initial layer of ice and its role in the formation of the crystalline structure of ice cover. [Pervichnyi sloi l'da i ego rol' v formirovanii kristallicheskogo stroeniia ledianogo pokrova].
Fedotov, V.I., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.7-17, In Russian. 8 refs.
Cherepanov, N.V.
Ice crystal structure, Ice formation, Ice cover, Ice crystal growth.

46-1772
Anisotropy of the elastic properties of ice cover with a space-ordered crystal structure. [Ob anizotropii uprugikh svoistv ledianogo pokrova s prostranstvenno-uporiadochennym kristallicheskim stroeniem].
Grigor'ev, A.A., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.18-25, In Russian. 10 refs.
Strakhov, M.V.
Ice elasticity, Ice crystal structure, Anisotropy, Ice cover, Statistical analysis.

46-1773
Methodology for determining and substantiating the normal resistance of ice to compression. [K voprosu o metodike opredeleniia i obosnovannosti normativnykh soprotivlenii l'da szhatiiu].
Nikitin, V.A., *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.26-35, In Russian. 8 refs.
Compressive properties, Ice strength, Ice cover strength, Ice temperature, Analysis (mathematics).

46-1774
Seasonal variations in the physical-mechanical characteristics of sea ice. [Sezonnaia izmenchivost' fiziko-mekhanicheskikh kharakteristik morskogo l'da].
Gavrilo, V.P., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.36-49, In Russian. 12 refs.
Lebedev, G.A., Fedotov, V.I., Cherepanov, N.V.
Brines, Sea ice, Ice mechanics, Ice cover strength, Ice physics, Seasonal variations, Analysis (mathematics).

46-1775
Experimental investigations of the thermally stressed state of ice. [Eksperimental'noe issledovanie termonapriazhennogo sostoianiia l'da].
Sukhorukov, K.K., *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.50-58, In Russian. 10 refs.
Thermal stresses, Temperature effects, Ice physics, Ice deformation, Ice temperature, Ice mechanics, Ice pressure.

46-1776
Insulating the ice cover of a water area as a means of preventing ice problems. [Ekranirovanie ledianogo pokrova akvatorii kak sposob borby s ledovymi zatrudneniiami].
Gavrilo, V.P., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.59-64, In Russian. 6 refs.
Gubanov, V.E., Lebedev, G.A., Sukhorukov, K.K.
Ice cover, Snow cover effect, Ice heat flux, Ice thermal properties, Thermodynamics, Countermeasures, Ice prevention, Analysis (mathematics).

46-1777
Characteristics of hummock formation on vertical walls in the Gulf of Finland. [K voprosu o kharakteristikakh torosoobrazovaniia u vertikal'noi stenki v Finskom zalive].
Gavrilo, V.P., *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.65-73, In Russian. 6 refs.
Hummocks, Ice solid interface, Sea ice, Ice mechanics, Analysis (mathematics).

46-1778
Self-oscillating processes in the friction of ice floes as a source of seismic-acoustic activity of ice cover during its interaction with elements of hydrotechnical structures (a review). [Avtokolebatel'nye protsessy pri trenii l'din kak istochnik seismoakusticheskoi aktivnosti ledianogo pokrova pri ego vzaimodeistvii s elementami konstruktsii gidrotekhnicheskikh sooruzhenii (obzor)].
Gavrilo, V.P., *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.74-84, In Russian. 18 refs.
Ice floes, Ice friction, Ice cover, Ice mechanics, Ice acoustics, Sea ice, Oscillations, Vibration, Ice solid interface.

46-1779
Calculating the effect of drifting hummock formations on the sea bottom during the laying of underwater pipelines. [Uchet vozdeistviia dreifuiushchikh torosistykh obrazovanii na morskoe dno pri proektirovanii podvodnykh truboprovodov].
Truskov, P.A., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.85-92, In Russian. 4 refs.
Beketskii, S.P.
Hummocks, Hydraulic structures, Pipelines, Ocean bottom, Pipe laying, Nomographs, Analysis (mathematics).

46-1780
Effect of petroleum products on the physical-mechanical characteristics of sea ice. [Vliianie nefteproduktov na fiziko-mekhanicheskie kharakteristiki morskogo l'da].
Gavrilo, V.P., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.93-97, In Russian. 2 refs.
Dmitriev, G.A., Tarashkevich, V.N.
Sea ice, Ice mechanics, Ice physics, Petroleum products, Environmental impact.

46-1781
Radar investigations of the thickness and composition of the ice sheet along the Mirnyy-Komsomol'skaya route. [Radiolokatsionnye issledovaniia tolshchiny i stroeniia lednikovogo pokrova po trasse Mirnyi-Komsomol'skaia].
Boiarskii, V.I., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.98-104, In Russian.
Ice cover thickness, Ice composition, Radiometry, Ice sheets, Radio echo soundings, Bedrock, Equipment.
Results obtained from radar sounding of the antarctic ice sheet, carried out by the radiophysical group of the 32nd Soviet Antarctic Expedition, are described. Data are given on the equipment used and the elevation of the ice sheet and bedrock along the new Mirnyy-Komsomol'skaya route. Also presented are data on the depth of internal inhomogeneities in the ice sheet. (Auth. mod.)

46-1782
Interpreting sea ice and bedrock of Antarctica from passive infrared sounding data. [Deshifrirovanie morskogo l'da i korennykh porod Antarktidy po dannym passivnogo IK-zondirovaniia].
Kirillov, V.A., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.105-115, In Russian. 5 refs.
Paramonov, A.I.
Bedrock, Sea ice, Ice cover, Thermal radiation, Infrared radiation, Surface temperature, Ice temperature, Analysis (mathematics), Antarctica, Bunger Hills.
Data from experimental investigations of natural thermal radiation in the infrared range from ice of various ages and strengths from the southern ocean, as well as the area of Bunger Hills, are presented. Results from a sample numerical interpretation of sea ice cover and sections of bedrock (horizontal projection) based on satellite data are also reported. (Auth. mod.)

46-1783
Observations of thermal infrared radiation from sea ice and water on the cruise of the nuclear icebreaker *Sibir'* to the North Pole in 1987. [Nabliudeniia za teplovym infrakrasnym izlucheniem morskogo l'da i vody v reise a.l "Sibir'" k Severnomu poliusu v 1987 g.].
Kirillov, V.A., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.116-127, In Russian. 2 refs.
Paramonov, A.I.
Sea ice, Sea water, Thermal radiation, Ice temperature, Ice cover thickness, Infrared radiation.

46-1784
Angular infrared sensor for determining the effective radiation and spectral reflectivity of sea water and sea ice from ships and airplanes. [Uglovoi infrakrasnyi datchik dlia opredeleniia effektivnogo izlucheniia i otrazhatel'noi sposobnosti morskoi vody i l'da s sudov i samoletov].
Paramonov, A.I., *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.128-137, In Russian. 11 refs.
Sea ice, Sea water, Infrared equipment, Measuring instruments, Reflectivity, Remote sensing, Surface temperature, Radiation measuring instruments, Ice physics, Spectra, Radiometry.

46-1785
Model calculations of UHF-emitting characteristics of fresh-water ice and frozen ground. [Model'nye raschety SVCh-izluchatel'nykh svoistv presnovodnogo l'da i merzlykh gruntov].
Melent'ev, V.V., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.138-146, In Russian. 12 refs.
Aleksandrov, V.IU.
Ice models, Ice electrical properties, Ice temperature, Mathematical models, Dielectric properties, Air ice water interaction, Frozen ground, Clays, Ice cover thickness, Snow depth, Snow cover, Radiometry.

46-1786
Developing an automatic method of determining boundaries separating zones of various types of ice. [Razrabotka avtomatizirovannogo metoda opredeleniia granits, razdeliaiushchikh zony razlichnykh l'dov].
Tarashkevich, V.N., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.147-152, In Russian. 5 refs.
Turchin, A.V., Chebotareva, V.A.
Sea ice, Ice surveys, Radiometry, Ice temperature, Velocity.

46-1787
Using a threshold autoregressive model in the processing of infrared-radiometry data on ice cover. [Ispol'zovanie porogovoi modeli avtoregressii v obrabotke dannykh IK-radiometrii ledianogo pokrova].
Ostashiavichus, E.K., et al. *Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1991, Vol.421, p.153-161, In Russian. 8 refs.
Tarashkevich, V.N., Chebotareva, V.A.
Mathematical models, Ice cover, Data processing, Radiometry, Ice temperature.

46-1788
United States antarctic activities, Part A: Modifications of plans for 1990-91; Part B: Plans for activities for 1991-92.
U.S. National Science Foundation, Washington, D.C., 1991, 145p.
Research projects.
Part A of this document includes changes to the information in Part B of the 1990 report. Part B includes the research projects and various elements of support that will be involved in the austral summer and winter activities of 1991-1992. A complete list of personnel in the U.S. Antarctic Program (USAP) is included as Appendix 1. The individual research projects of 1991-1992, grouped by discipline, are described in Appendix 2. The organization and content of this report is provided as information exchange under Articles III(1) and VII(5) of the Antarctic Treaty. The format is that prescribed in the Annex to Treaty Recommendation VIII-6, as amended by Recommendation XIII-3. While the principal activity reported herein is the national Antarctic Program (USAP) under management of the National Science Foundation (NSF), other activities (e.g. tourism) sponsored by private U.S. groups or individuals are included. Visits to U.S. antarctic stations by nongovernmental groups are included in Section XVI.

46-1789
Forecasting the location of the ice edge in Davis Strait and the Labrador Sea during the spring-summer period. [Prognozirovanie polozheniia kromki l'da v Devisovom prolive i Labradorskom more v vesenne-letnii period].
Mironov, E.U., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.6-14, In Russian. 11 refs.
Ice edge, Ice forecasting, Long range forecasting.

46-1790
Conditions for the formation of large-scale anomalies in ice conditions at sea. [Usloviia formirovaniia krupnykh anomaliĭ ledovitosti v more].
Karelin, I.D., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.15-24, In Russian. 10 refs.
Kirillov, A.A.
Ice conditions, Sea ice, Atmospheric disturbances, Drift, Air temperature.

46-1791
Characteristics of the variability in areas of ice packs in the West Siberian Sea. [Osobennosti izmenchivosti ploshchadeĭ ledianykh massivov Vostochno-Sibirskogo moria].
IUlin, A.V., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.25-36, In Russian. 6 refs.
Sea ice, Pack ice, Statistical analysis.

46-1792
Structure of the ice cover in the Sea of Okhotsk. [Struktura ledianogo pokrova Okhotskogo moria].
Kovshov, V.A., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.37-47, In Russian. 9 refs.
Borodachev, V.E.
Ice cover, Ice structure.

46-1793
Changes in the volume of ice in the Gulf of Finland. [Kolebaniia ob"ema l'dov v Finskom zalive].
Drabkin, V.V., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.48-59, In Russian. 19 refs.
Kliachkin, S.V.
Sea ice, Ice volume, Analysis (mathematics).

46-1794
Fall-winter thermohaline convection and bottom ice formation at sea. [Osenne-zimniaia termokhalinnaia konvektsiia i vnutrivodnoe ledoobrazovanie v more].
Tyshko, K.P., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.60-69, In Russian. 9 refs.
Sea water, Salt water, Salinity, Water temperature, Convection, Bottom ice, Sea water freezing.

46-1795
Effect of Novaya Zemlya bora winds on ice drift in the eastern part of the Barents Sea. [Vliianie Novozemel'skoĭ bory na dreif l'da v vostochnoĭ chasti Barentseva moria].
Gorbunov, IU.A., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.70-80, In Russian. 7 refs.
Porubaev, V.S.
Drift, Wind factors, Sea ice, Analysis (mathematics).

46-1796
Dependence of sea ice compression on various parameters in the atmospheric pressure field. [Zavisimost' szhatiia morskogo l'da ot razlichnykh parametrov polia atmosfernogo davleniia].
Voevodin, V.A., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.81-88, In Russian. 5 refs.
Sea ice, Compressive properties, Ice air interface, Atmospheric pressure.

46-1797
Calculating wind velocity in nonstationary barometric developments for problems in short-range ice forecasting. [Raschet skorosti vetra v nestatsionarnykh baricheskikh obrazovaniakh v primenenii k zadacham kratkosrochnogo ledovogo prognoza].
Pozdnyshev, S.P., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.89-99, In Russian. 16 refs.
Wind velocity, Ice forecasting, Atmospheric disturbances, Analysis (mathematics).

46-1798
Modification of the marker method in modeling the shifting of ice edges. [Modifikatsiia metoda markerov dlia modelirovaniia peremeshcheniia kromki l'da].
Speranskiĭ, D.A., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.100-106, In Russian. 11 refs.
Ice edge, Ice models, Markers, Mathematical models.

46-1799
Multi-year grounded ice hummocks in the Kara Sea. [Mnogoletnie stamukhi v Karskom more].
Borodachev, V.E., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.107-115, In Russian. 4 refs.
Komov, N.I., Dvorkin, E.N.
Hummocks, Grounded ice, Drift, Ice mechanics, Sea ice.

46-1800
Morphological characteristics of grounded ice hummocks. [O morfologicheskikh kharakteristikakh stamukh].
Borodachev, V.E., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.116-128, In Russian. 11 refs.
Beketskiĭ, S.P., Truskov, P.A., Polomoshnov, A.M.
Hummocks, Grounded ice, Sea ice, Ice structure.

46-1801
Relationship between ice deterioration and the number of ice fields. [O sviazi mezhdu razrushennost' iu l'da i kolichestvom ledianykh poleĭ].
Komov, N.I., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.129-133, In Russian. 4 refs.
Ice deterioration, Sea ice, Ice mechanics, Ice strength.

46-1802
Current status of requirements for ice information. [O trebovaniiakh k ledovoĭ informatsii na sovremennom etape].
Kuznetsov, I.M., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.134-156, In Russian. 42 refs.
Ice reporting, Ice cover, Sea ice, Ice navigation, Data processing.

46-1803
Automated field data processing and correlation system for hydrometeorological information used in the PEGAS forecasting system. [Avtomatizirovannyĭ programmnyĭ kompleks po obrabotke i obobshcheniiu gidrometeorologicheskoĭ informatsii, ispol'zuemoĭ v prognosticheskoĭ sisteme "PEGAS"].
IUlin, A.V., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.157-162, In Russian. 2 refs.
Data processing, Computer programs, Ice forecasting, Long range forecasting.

46-1804
Calculating ice navigation difficulties of ships in the White Sea in the compilation of navigation recommendations. [Uchet trudnosti plavaniia sudov vo l'dakh Belogo moria pri sostavlenii navigatsionnykh rekomendatsiĭ].
Buzuev, A.IA., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.163-170, In Russian. 5 refs.
Makarov, E.I., Skripnik, E.N.
Ice navigation, Analysis (mathematics), Ships.

46-1805
Effect of small-scale variations in the ice cover of the Yenisey River on the operation of an icebreaker with an ice-removing attachment. [Vliianie melkomasshtabnoĭ izmenchivosti ledianogo pokrova reki Eniseĭ na rabotu ledokola s pristavkoĭ].
Rubanov, A.N., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.171-173, In Russian. 2 refs.
Equipment, Ice cover effect, Velocity, River ice, Icebreakers, Ice removal.

46-1806
Determining the possible navigation conditions in fast ice in Ob' Bay. [Otsenka vozmozhnykh uslovii sudokhodstva v pripae Obskoĭ guby].
Smirnov, V.I., et al, *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.174-177, In Russian. 4 refs.
Astakhova, I.N., Abramov, V.A.
Ice navigation, Fast ice, Analysis (mathematics).

46-1807
Small-scale spatial variability of ice drift in the winter period. [O mezomasshtabnoĭ prostranstvennoĭ izmenchivosti dreifa l'da v zimnii period].
Panfilov, A.A., *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy*, 1990, Vol.418, p.178-184, In Russian. 7 refs.
Drift, Seasonal variations, Ice mechanics, Sea ice, Velocity measurement.

46-1808
Proceedings.
International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Fairbanks, University of Alaska, 1991, 570p., Refs. passim
For individual papers see 46-1809 through 46-1853
Zarling, J.P., ed, Faussett, S.L., ed.
Heat transfer, Phase transformations, Liquid solid interfaces, Soil freezing, Ice formation, Frozen ground thermodynamics, Ice water interface, Pipe flow.

46-1809
Phase change heat transfer in porous media.
Viskanta, R., International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.1-24, 80 refs.
Heat transfer, Phase transformations, Liquid solid interfaces, Porous materials, Mathematical models, Soil freezing.

46-1810
Icing phenomena and frost formation.
Lozowski, E.P., International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.25-45, 53 refs.
Icing, Hoarfrost, Ice accretion, Ice formation, Mathematical models.

46-1811
Micro-macro freezing of biological substances.
Hayashi, Y., International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.47-56, 7 refs.
Cryobiology, Phase transformations, Ice formation, Organic nuclei, Nucleation, Heat transfer, Physiological effects, Mathematical models.

46-1812
Thermal properties and the nature of freezing soils.
Williams, P.J., International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.57-67, 12 refs.
Soil freezing, Frozen ground thermodynamics, Unfrozen water content, Soil water migration, Thermal properties.

46-1813
Recent studies on combined contact and natural convection melting.
Saitoh, T., International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.69-81, 33 refs.
Heat transfer, Phase transformations, Liquid solid interfaces, Convection, Melting, Heat recovery, Analysis (mathematics).

46-1814
Application of a finite element model to hydrate reservoirs.
Kas, D.K., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.83-98, 12 refs.
Srivastava, V.
Hydrates, Natural gas, Gas production, Permafrost thermal properties, Heat transfer, Phase transformations, Mathematical models.

46-1815
Finite element technique for three-dimensional freeze-thaw prediction.
McGilvary, W.R., et al. MP 2988, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.99-116, 14 refs.
Albert, M.R.
Phase transformations, Liquid solid interfaces, Heat transfer, Conduction, Freezing front, Ground thawing, Mathematical models.
Heat conduction with phase change characterizes many problems in cold regions heat transfer. The analysis of practical, multi-dimensional problems is made challenging because of the moving phase-change interface, the difference in thermal properties between frozen and thawed phases, mixed boundary conditions, various heat sources, and complex geometry. The finite element technique has thus far been used successfully to analyze two-dimensional problems. In the current work, O'Neill's method of simulating phase change in two dimensions is extended to three dimensions. Phase change occurs at a discrete temperature and is implemented via a Dirac delta function. For cases where the elemental volume becomes isothermal at the phase change temperature, a so-called mushy region, a variation of O'Neill's method is presented. Included in the model are typical boundary conditions and source terms that may be useful to analyze both passive and active arctic foundations, thaw degradation around a borehole, stabilization of road embankments, or phase-change heat storage devices.

46-1816
Finite differences with singular heat capacity and stability considerations for phase change computation.
O'Neill, K., MP 2989, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.117-133, 25 refs.
Phase transformations, Heat transfer, Liquid solid interfaces, Heat capacity, Boundary value problems, Freezing front, Analysis (mathematics).
It has been shown in previous work with finite elements that one can account for phase change latent heat effects computationally by embedded a singularity ("delta function") in the heat capacity. Normal finite element procedures then evaluate the apparent heat capacity (AHC) exactly, and computed results have been good. In this paper it is shown that the same methodology can be generalized to include a finite difference formulation which also works well. In addition, as a first attempt at rational stability analysis of the numerical phase change problem, simple representative 1-D cases are considered in the framework of a moving boundary formulation. The analysis produces distinct and sometimes counter-intuitive stability criteria relating simultaneously to the time stepping solution and the embedded iteration system for dealing with the nonlinearity. Results are borne out in numerical tests, and may furnish stability guidance for more general moving-boundary type phase change calculation. At least in the simple test cases investigated, the AHC system outlined above is not restricted by the stability bounds applicable to the moving boundary formulation.

46-1817
Numerical model for heat and moisture transport in soils due to mobile water vapor.
Goering, D.J., International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.135-142, 4 refs.
Soil freezing, Soil water migration, Frozen ground thermodynamics, Moisture transfer, Heat transfer, Ground thawing, Mathematical models.

46-1818
Freezing and thawing in soils with convective groundwater flow.
Goering, D.J., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.143-153, 7 refs.
Zhang, L.Z.
Soil freezing, Ground thawing, Ground water, Heat transfer, Convection, Underground pipelines, Mathematical models.

46-1819
Computation of heat conduction in self-similar porous structures.
Yu, B.M., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.155-165, 16 refs.
Heat transfer, Conduction, Porous materials, Analysis (mathematics).

46-1820
Morphology of ice structure in a parallel plate channel.
Weigand, B., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.167-176, 14 refs.
Beer, H.
Ice formation, Ice structure, Ice water interface, Heat transfer, Water flow, Analysis (mathematics).

46-1821
Drainage of selected common ice melters through packed beds of ice cubes.
Stickler, L.A., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.177-185, 2 refs.
Cai, L., Stewart, W.E., Jr.
Artificial melting, Snow roads, Snow compaction, Ice melting, Salting, Snow melting.

46-1822
Review of intrinsic thermophysical properties of snow, ice, sea ice, and frost.
Yen, Y.C., et al, MP 2990, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.187-218, 91 refs.
Cheng, K.C., Fukusako, S.
Ice thermal properties, Snow thermal properties, Icing, Heat transfer, Thermal conductivity, Specific heat, Latent heat, Ice density, Thermal expansion, Analysis (mathematics).
This paper reviews the intrinsic thermophysical properties of snow, ice, sea ice and frost. The subjects of density, thermal expansion and compressibility of ice are discussed. In addition, the absorption coefficient of ice along with the heat capacity, latent heat of fusion and thermal conductivity of snow and ice are summarized. These topics are analyzed over a wide range of temperatures and, in the case of snow and frost, the effect of density is evaluated. The contributions of vapor diffusion and radiative and free convective heat transfer across the pore space are assessed in relation to the overall effective thermal conductivity of snow and frost. Frost layer growth rate and thickness as functions of air velocity, temperature and humidity, cooling plate surface temperature and time are also discussed. Expressions representing the specific and latent heat of sea ice in terms of salinity and temperature are given, and theoretical models to predict the thermal conductivities of fresh bubbly ice and sea ice as functions of salinity, temperature and air content are also derived.

46-1823
Ice formation and melting heat transfer with water flow around isothermally cooled cylinders in staggered and aligned arrangements.
Hirata, T., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.219-233, 8 refs.
Matsui, H.
Ice formation, Ice melting, Ice water interface, Heat transfer, Water flow, Mathematical models.

46-1824
Cable ice shedding due to the mechanical breaking of ice.
Druez, J., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.235-245, 16 refs.
Louchez, S., McComber, P.
Power line icing, Ice breaking, Ice strength, Ice accretion, Ice loads.

46-1825
Forced convective heating of alluvium reinforced spherical ice.
Wimberly, C.R., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.247-256, 7 refs.
Martinez, A.J.
Ice (construction material), Alluvium, Ice strength, Artificial ice, Heat transfer, Convection.

46-1826
Experimental study of ice-layer transition phenomena observed in a duct containing water flow.
Tago, M., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.257-269, 6 refs.
Ice formation, Ice water interface, Pipe flow, Water flow, Ducts.

46-1827
Heat transfer and ice formation on two horizontal tubes set across water flow.
Saito, H., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.271-280, 3 refs.
Ice formation, Heat transfer, Ice water interface, Water flow, Pipes (tubes), Analysis (mathematics).

46-1828
VISICE computer model: mathematical correlations between temperature, stress, and deflection.
Barthelemy, J.L., International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.281-291, 5 refs.
Ice cover strength, Ice runways, Ice elasticity, Heat transfer, Computer programs, Mathematical models, Ice loads, Antarctica, McMurdo Station.
The finite-element computer program VISICE predicts both the elastic and linear visco-elastic responses of a floating sea-ice sheet to loads applied at the surface. Output data in the form of stress and deflection are used to develop landing and parking curves for aircraft operating at McMurdo Station. As ambient temperature conditions change, however, the transfer of heat to or from a loaded ice sheet may have a significant effect on its load-bearing capacity. Some useful mathematical correlations are developed between input variables and modeled output response. These similarity relationships are helpful in developing nomographs that illustrate required ice thickness for landing and parking in terms of gross aircraft weight, surface temperature and wheel configuration. (Auth.)

46-1829
Peculiarities of phase changes in quartz sand saturated with salt solutions at 0 C +/- 40 C.
Frolov, A.D., International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.293-302, 15 refs.
Frozen ground thermodynamics, Sands, Soil freezing, Saline soils, Phase transformations, Ground thawing.

46-1830
Soil and groundwater contamination by petroleum products in frozen soil.
Corapcioglu, M.Y., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.303-309, 10 refs.
Panday, S.M.
Frozen ground chemistry, Tundra, Oil spills, Frozen ground thermodynamics, Soil pollution, Ground water, Mathematical models.

46-1831
Interpreting thermal conductivity measurements in frozen porous media.
Van Loon, W.K.P., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.311-321, 12 refs.
Van Haneghem, I.A., Boshoven, H.P.A., Perfect, E.
Frozen ground thermodynamics, Soil freezing, Porous materials, Thermal conductivity, Unfrozen water content, Freezing front.

46-1832
Experimental study on thermal conductivity close to the freezing front in the ground.
Sawada, S., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.323-329, 2 refs.
Frozen ground thermodynamics, Soil freezing, Freezing front, Thermal conductivity, Frost heave, Soil water migration.

46-1833
Freezing and thawing effect on physical properties of agricultural soils.
Rickerl, D.H., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.331-339, 9 refs.
Beck, D.
Soil freezing, Freeze thaw cycles, Frost penetration, Thaw depth, Agriculture, Snow cover effect.

46-1834
Model for the thermal regime of permafrost within the depth of annual temperature variations.
Zhang, T., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.341-347, 5 refs.
Osterkamp, T.E., Gosink, J.P.
Permafrost depth, Permafrost thermal properties, Seasonal variations, Temperature variations, Thermal regime, Mathematical models.

46-1835
Changes in microstructure of fine-grained soils due to freezing.
Grechishchev, S.E., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.349-362, 10 refs.
Pavlov, A.V., Ponomarev, V.V.
Soil freezing, Soil structure, Soil texture, Microstructure, Electron microscopy, X ray diffraction.

46-1836
Effects of freezing and thawing on landfill covers and liners.
Zimmie, T.F., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.363-371, 6 refs.
LaPlante, C.M., Bronson, D.L.
Freeze thaw cycles, Soil freezing, Permeability, Waste disposal, Clay soils, Sanitary engineering, Earth fills, Frozen ground.

46-1837
Passive radiator for a refrigerated foundation in permafrost.
Bhargava, R., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.373-381, 2 refs.
Bassler, D., Patterson, J.
Foundations, Permafrost beneath structures, Artificial freezing, Frozen ground strength, Refrigeration, Permafrost preservation.

46-1838
Ice island construction with ice-water mixtures.
Forest, T.W., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.383-395, 7 refs.
Szilder, K., Lozowski, E.P.
Ice islands, Artificial freezing, Ice (construction material), Ice water interface, Sea water freezing, Artificial islands.

46-1839
Effect of fin pitches on defrosting of heat exchangers.
Sugawara, M., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.397-404, 12 refs.
Sakae, S., Fujita, T.
Heat transfer, Defrosting, Air conditioning, Ice solid interface.

46-1840
Turbulent frictional behaviour of a bayonet tube.
Lock, G.S.H., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.405-416, 10 refs.
Wu, M.L.
Permafrost preservation, Cooling systems, Heat transfer, Pipes (tubes), Pipe flow, Turbulent flow.

46-1841
Heat transfer characteristics of the cranked thermosyphon.
Lock, G.S.H., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.417-427, 13 refs.
Ladoon, D.
Heat transfer, Fluid flow, Pipe flow, Pipes (tubes), Heat pipes, Cooling systems.

46-1842
Laminar frictional behaviour of a bayonet tube.
Lock, G.S.H., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.429-440, 5 refs.
Wu, M.L.
Heat transfer, Cooling systems, Permafrost preservation, Pipe flow, Pipes (tubes), Laminar flow.

46-1843
Thermal performance of a two-phase solar collector in cold regions by indoor test.
Cheng, K.C., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.441-453, 8 refs.
Lee, C.A.
Heat transfer, Heat sources, Solar radiation, Heat pipes.

46-1844
On the onset of convection of water near 4 C.
Yen, Y.C., MP 2991, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.455-470, 480, 12 refs.
Heat transfer, Convection, Ice water interface, Water flow, Water structure, Hydrodynamics, Temperature effects, Water temperature, Analysis (mathematics).
Natural convection heat transfer has been studied extensively, both experimentally and analytically, and the results have been well documented. However, nearly all the work reported has dealt with fluids having monotonic density-temperature relationships or with a temperature range that precludes a density inversion. Water possesses a density anomaly at about 4 C (3-98). Therefore, for either a single-phase layer containing 4 C water or a layer formed as a result of melting ice, the classical criterion of Rayleigh stability cannot be applied. This review summarizes the studies conducted since the early 1960s on the effect of this unique density inversion on the onset of convection in a number of geometrical configurations. It has been clearly demonstrated both analytically and experimentally that the critical Rayleigh number or the critical Grashof number for either a water or ice-water system is no longer a constant value, but varies with the imposed thermal and geometric conditions.

46-1845
Estimation of air permeability and thermal insulation of fiber assemblies.
Fujimoto, T., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.471-479, 5 refs.
Seki, N.
Clothing, Thermal insulation, Permeability.

46-1846
Heat transfer associated with convection and vapor transport in dry snow.
Albert, M.R., et al, MP 2992, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.481-494, 19 refs.
McGilvary, W.R.
Snow air interface, Snow heat flux, Snow thermal properties, Heat transfer, Convection, Vapor transfer, Air flow, Snow permeability, Mathematical models.
The coupled heat and mass transfer problem of air flow through snow subject to an imposed temperature gradient is investigated numerically. A new method is proposed for the theoretical prediction of vapor transport, whereby the snow is not assumed to be saturated with vapor. Results are shown to compare favorably with analytical and experimental results. For forced convection with the set of experimental conditions examined here, it is demonstrated that the heat transfer associated with vapor transport is significant in the determination of the temperature profile, but that the major effect is due to heat convected by the dry air.

46-1847
Three-dimensional natural convective heat transfer in enclosures with various geometries.
Saito, H., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.495-504, 6 refs.
Heat transfer, Convection, Fluid flow, Porous materials, Mathematical models.

46-1848
Thermocapillary and gravity convection of liquid fuel in open cavities.
Tokura, I., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.505-514.
Hanaoka, Y., Saito, H., Kishinami, K.
Oil spills, Radiant heating, Convection, Heat flux, Capillarity, Liquids, Surface energy, Mathematical models.

46-1849
Local similarity solution for freezing in a semi-infinite medium with wall convection.
Aziz, A., et al, MP 2993, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.515-522, 11 refs.
Lunardini, V.J.
Phase transformations, Heat transfer, Liquid solid interfaces, Freezing front, Convection, Boundary value problems, Stefan problem, Analysis (mathematics).
An instantaneous similarity solution is developed for the freezing of a semi-infinite extent of liquid initially at its freezing temperature and cooled by convection at the wall. The solution involves four parameters pseudo similarity variable eta, dimensionless time A, freezing front parameter lambda, and Stefan number S. The transcendental equation relating eta, S and A is solved numerically and the results are presented in graphical form. The progress of the freezing front is displayed for S=0.1, 0.2, 0.5, 1.0, 2.0, and 3.0. These results are compared with the heat balance integral, perturbation, and analog solutions and found to be quite accurate. Results for the surface temperature history for S=0.5, 1, 5, and 10 also compare well with the corresponding heat balance integral results. The solution strategy appears to be potentially useful for other nonsimilar phase change problems.

46-1850
Characteristics of impingement heat transfer caused by circular jets with confined wall.
Ichimiya, K., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.523-532, 9 refs.
Okuyama, K.
Heat transfer, Air flow.

46-1851
Nonlinear heat transfer with phase change in homogeneous materials.
Budkowska, B.B., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.533-545, 22 refs.
Kreja, I.
Heat transfer, Phase transformations, Liquid solid interfaces, Conduction, Boundary value problems, Analysis (mathematics).

46-1852
Simulation of gas hydrate formation in pipelines and deep wells.
Bondarev, E.A., et al, International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.547-556, 3 refs.
Kapitonova, T.A.
Hydrates, Gas pipelines, Heat transfer, Fluid flow, Pipe flow, Underground pipelines, Frozen ground thermodynamics, Mathematical models.

46-1853
Temperature calculations for multiple systems in frozen heterogeneous soil.
[Anitskiĭ, P.A., International Symposium on Cold Regions Heat Transfer, 3rd, Fairbanks, AK, June 11-14, 1991. Proceedings. Edited by J.P. Zarling and S.L. Faussett, Fairbanks, University of Alaska, 1991, p.557-567, 5 refs.
Underground pipelines, Frozen ground temperature, Frozen ground thermodynamics, Heat transfer, Analysis (mathematics).

46-1854
Wavy ice growth in forced flow.
Albert, M.R., MP 2994, San Diego, University of California, 1991, 97p., Ph.D. thesis. Refs. passim.
Ice formation, Ice growth, Ice water interface, Fluid flow, Turbulent flow, Laminar flow, Pipe flow, Boundary value problems, Ice models, Mathematical models, Ice heat flux.
The goal of this work is to develop the analysis capability for predicting irregular and wavy ice formations in forced laminar and turbulent flow, and to use that capability in initial investigations in ice formation in internal flows such as in pipes or conduits. The stability of a small-amplitude perturbation of the ice interface in pipes is investigated, using analytical solutions for heat conduction in the ice and numerical solutions for heat transfer from the fluid. The analysis shows that, for small-amplitude perturbations and wavelengths up to sixty times the pipe diameter, heat transfer effects from the flow alone cannot cause the onset of instability. However, heat transfer from the ice in the cylindrical geometry of a pipe can have a destabilizing influence on ice growth. The destabilizing influence is most likely to occur during freezing, for thick ice and long wavelengths. Numerical experiments are conducted with the fully nonlinear moving boundary model in which both smooth ice and irregular ice profiles evolve. It is shown that the introduction of a numerical perturbation into a simulation involving initially flat ice and uniform boundary and inlet conditions can lead to a step ice profile and eventual flow recirculation. The step ice profile results from the turbulent heat transfer, and serves to illustrate the importance of including turbulence calculations in the flow field.

46-1855
USNS *Bartlett* cruise to the Greenland Sea in August 1990. Data report.
Paquette, R.G., et al, *U.S. Naval Postgraduate School, Monterey, CA. Report*, Nov. 1991, NPS-OC-92-001, 16p. + appends., 11 refs.
Bourke, R.H., Stone, M.D.
Oceanographic surveys, Ocean currents, Hydrography, Water transport, Salinity, Water pressure, Water temperature, Greenland Sea.

46-1856
Snow survey of Great Britain, 1990/91. London, Meteorological Office, Sep. 1991, 22p.
Snow surveys, Snow depth, Snow cover distribution, Meteorological data, United Kingdom.

46-1857
Parametric model study of ships ramming multi-year ice floes. Physical modelling of ship/ice interaction. Report 2.
Daley, C., et al, *Finland. Technical Research Centre. Research reports*, 1991, No.744, 60p., With French summary. 24 refs.
Kivimaa, S.
Icebreakers, Ice breaking, Ice loads, Ice navigation, Ice cover strength, Impact tests, Penetration tests, Ice floes, Ice solid interface.

46-1858
Cutting tests of ice. [Jäänleikkuukokeet],
Jussila, M., *Finland. Technical Research Centre. Research reports*, 1991, No.745, 85p. + appends., In Finnish with English summary. 6 refs.
Ice cutting, Ice cover strength, Strain tests, Sea ice, Ice loads, Propellers, Analysis (mathematics).

46-1859
Environmental effects of salt-free winter road maintenance in Gotland. [Miljöeffekter av saltfri vintervägh-allning pa Gotland],
Bäckman, L., *Sweden. Statens väg- och trafikinstitut. VTI meddelande*, 1991, No.663, 20p. + appends., In Swedish with English summary.
Salting, Environmental impact, Soil pollution, Road maintenance, Winter maintenance.

46-1860
Admixtures for cold weather concreting.
Korhonen, C.J., *American Public Works Association. APWA reporter*, Jan. 1992, 59(1), MP 2987, p.24.
Winter concreting, Antifreezes, Concrete admixtures.

46-1861
Computer tutorial and animation of the normal ice cycle of the Laurentian Great Lakes of North America for 1960-1979.
Assel, R.A., et al, *U.S. National Oceanic and Atmospheric Administration. NOAA technical memorandum*, Nov. 1991, ERL GLERL-76, 13p. + appends., 16 refs.
Ratkos, J.M.
Ice conditions, Lake ice, Ice surveys, Ice cover, Sounding, Computer programs, Great Lakes.

46-1862
Detailed test plan for the Production Qualification Test (PQT) of the Mobile Oversnow Transport (MOST) (snowmobile). TECOM Project No.8-VS-150-MST-003 and Production Qualification Test (PQT) of the Mobile Oversnow Transport (MOST) (sled), TECOM Project No.8-VS-150-MST-004.
Todd, W.E., Seattle, U.S. Army Cold Regions Test Center, Jan. 1992, 38p. + appends., U.S. Army Test and Evaluation Command, TECOM project No.8-VS-150-MST-003/004, 18 refs.
Snow vehicles, Sleds, Military equipment, Cold weather tests.

46-1863
Abbreviated test plan for the follow-on production, cold temperature reliability test for the M734 Multi-Option Fuze.
Wilson, L.L., Seattle, U.S. Army Cold Regions Test Center, Dec. 1991, 9p. + appends., U.S. Army Test and Evaluation Command, TECOM project No.2-MU-007-734-033, 6 refs.
Cold weather performance, Explosives, Cold weather tests, Military equipment.

46-1864
Membrane for in-situ optical detection of organic nitro compounds based on fluorescence quenching.
Seitz, W.R., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Jan. 1991, SR 91-01, 10p., ADA-244 261, 12 refs.
Jian, C., Sundberg, D.C.
Explosives, Detection.
Quenching of emission from fluorescent membranes was evaluated for detecting organo nitro compounds used as explosives. The most sensitive membrane is prepared using solvent casting from cyclohexanone to incorporate pyrenebutyric acid into cellulose triacetate plasticized with isodecyldiphenyl phosphate. The response appears to follow the Stern-Vollmer law for TNT and DNT. The membrane also responds to RDX, but with less sensitivity. Detection limits are approximately 2 ppm for DNT and TNT and 10 ppm for RDX. Attempts were made to adapt the membrane for remote in-situ measurements. In this context, the extent of quenching needs to be determined from the decrease in fluorescence lifetime because this type of measurement is fairly impervious to drift and interference. Fluorescence intensities were measured remotely through fiber optics; however, this was only done when the load resistance in the detection circuit was large, such that the fluorescence decay reflected the RC time constant of the detection electronics rather than the fluorescence lifetime.

46-1865
Operators manual for determining mole percent purity using IMPURE.
Pidgeon, D., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Aug. 1991, SR 91-11, 33p., ADA-242 592, 12 refs.
Black, P.B.
Manuals, Computer programs, Laboratory techniques, Data processing, Freezing points, Temperature measurement, Standards.
This report presents the laboratory procedures and operation of the computer program IMPURE, which allows the operator to measure the mole percent purity of Standard Analytical Reference Materials (SARMs). Melting point temperature, freezing point depression and heat of fusion are measured by differential scanning calorimetry (DSC). These data are then used in van't Hoff's equation to determine molar purity. IMPURE was written to control the operation of the DSC and the analyses of the collected data according to American Society of Testing and Materials (ASTM) standards.

46-1866
IONPAIR: a chemical speciation program for calcareous and gypsiferous soil solutions.
Marion, G.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Sep. 1991, SR 91-12, 12p., ADA-242 593, 16 refs.
Soil chemistry, Chemical composition, Soil water, Computer programs.
The IONPAIR program was designed to speciate the chemical composition of calcareous and gypsiferous soil solutions. The program uses the Newton-Raphson algorithm to solve by successive approximations a set of non-linear equations relating ionic concentrations and activities. This program allows the user to specify as input any two of the following three variables: pH, alkalinity and P(CO2). This flexibility allows one to check the internal consistency of experimental measurements, equilibrium constants and model assumptions. For example, is total alkalinity equal to inorganic carbon alkalinity? IONPAIR was designed as a "stand-alone" program, which means that it is easily usable and is available in both Macintosh and MS-DOS versions.

46-1867
Role of donor-acceptor interactions in the sorption of TNT and other nitroaromatics from solution.
Leggett, D.C., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Sep. 1991, SR 91-13, 8p., ADA-243 235, Refs. p.5-8.
Explosives, Soil chemistry, Soil pollution.
The evidence related to sorptive interactions of nitroaromatics is reviewed. Although evidence from a variety of organic model systems suggests that sorptive interaction of nitroaromatics with organic components will occur, the statistical evidence attributes greater importance to inorganic components over organic matter in soil sorption of TNT. It was concluded that donor-acceptor interactions are more important than purely hydrophobic effects in the sorption of nitroaromatics from solution onto soils and model sorbents. Furthermore, TNT in soil-water systems may become an ultimate recipient of charge causing its reductive transformation and subsequent covalent bonding to soil organic matter components.

46-1868
User's manual for ESTK1D.FOR and ESTK2S.FOR wavenumber estimation routines.
Moran, M.L., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Oct. 1991, SR 91-15, 15p., ADA-244 099, 7 refs.
Manuals, Computer programs.
This document describes the operation and structure of the Fortran programs ESTK1D.FOR and ESTK2D.FOR. These frequency domain wavenumber estimation programs implement either the Bartlett or the high-resolution Capon (1969) maximum-likelihood beamformers. The program ESTK1D.FOR forms a beam response based on a one-dimensional observation wavenumber that is rotated through wavenumber space to determine the spatial bearing of a plane wave source. ESTK2D.FOR uses the beam response in two-dimensional wavenumber space to estimate the two-dimensional wavenumber vector of a plane wave source. The discussion presented in this paper focuses on the operational details of installing and running ESTK1D and ESTK2D.

46-1869
Numerical models for forecasting ice conditions on the Ohio River.
Shen, H.T., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Sep. 1991, CR 91-16, 55p., ADA-243 336, 20 refs.
Bjedov, G., Daly, S.F., Lal, A.M.W.
Ice models, Mathematical models, Ice cover, Computerized simulation, River ice, Frazil ice, Ice conditions, Ice forecasting, Ice navigation, Theories, Ice jams, Water temperature, United States, Ohio, Ohio River.
A numerical model, RICEOH, for simulating flow and ice conditions in a dendritic river system is developed. The flow computations use a double-sweep algorithm for unsteady shallow-water wave equations. The distributions of water temperatures and ice concentration are determined using a Lagrangian-Eulerian scheme. The formation of an ice cover is modeled using existing equilibrium ice jam theories. Frazil ice deposition and erosion are modeled by a simple critical-velocity criterion. The thermal growth and decay of an ice cover is calculated by a quasi-steady finite-difference method. The model is applied to the Ohio River system between Pittsburgh, PA, and Meldahl, OH. Comparisons with field observations show that the model can provide good simulation for ice conditions.

46-1870
Geophysical investigations of an anomalous unfrozen zone, Caribou Peak, Alaska.
Lawson, D.E., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Oct. 1991, CR 91-17, 23p., ADA-244 257, 34 refs.
Arcone, S.A., Collins, C.M.
Ground water, Permafrost distribution, Permafrost hydrology, Taliks, Geophysical surveys, United States, Alaska, Caribou Peak.
The occurrence of unfrozen materials and groundwater flow on a north-facing slope in interior Alaska is important to recognize, both for predicting the spatial distribution of perennially frozen ground as well as for understanding watershed hydrology. An anomalous unfrozen zone or talik was located on the northern slope of Caribou Peak by drilling in Apr 1985. Impulse radar surveying of the area immediately adjacent to this drill hole, as well as on three transects upslope of its location, revealed that the unfrozen zone is the result of groundwater flow in the bedrock along a relatively planar zone, interpreted as a fracture. This fracture and two others located by the radar are continuous in the direction of the slope, trending generally N20E and dipping about 9E. Geologic logs indicate that the drill hole intersected a fracture in the bedrock, a quartz-muscovite schist, at a depth of about 8.5 to 9.0 m. Downhole measurements show ground temperatures at this depth are generally uniform and slightly above freezing throughout the year, suggesting continuous flow of groundwater within the planar structure. Analysis of the freezing point of the groundwater sample indicates normal freezing beginning at 0 C, while ion chromatography indicated that the water was fresh and not highly mineralized. Vegetation patterns, coupled with the borehole location and fracture orientation, suggest that flow originates within the upper and central parts of the peak and discharges into the valley of Poker Creek. The source of the groundwater is unknown, but appears to be an aquifer in the south-facing non-permafrost side of Caribou Peak that is intersected by the north-south striking fractures. These fractures then transport the water to the northern face and channel it through the permanently frozen layer beneath this side. In addition to identifying these unfrozen, localized groundwater flows within perennially frozen bedrock, the radar profiles also revealed signatures that suggest a transition in unfrozen water content within the marginally frozen colluvium.

46-1871
Analysis of river ice motion near a breaking front.
Ferrick, M.G., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Oct. 1991, CR 91-18, 17p., ADA-243 431, 9 refs.
Weyrick, P.B., Hunnewell, S.T.
River ice, Ice breakup, Velocity.
A quantitative theory of dynamic river ice breakup is not yet available. One of the essential components of such a theory is a description of the ice motion near the breaking front. In this report the authors develop an analysis of this motion for a specific case that is consistent with observed data. The analysis is generalized by allowing the speed of the breaking front to vary, and the parameters of the ice motion that are obtained represent different dynamic breakup behaviors that have been described previously. The results of the analysis include 1) the hydraulic radius associated with the ice cover and the total ice acceleration as functions of time, 2) the equilibrium ice velocity as a function of bank resistance, and the ice velocity as a function of time for several initial and bank resistance conditions, 3) the time-varying bank resistance at the measurement location, and 4) the time of ice motion, ice velocity, ice acceleration, and the convergence of the moving ice with distance from the breaking front. The measure of ice convergence quantifies the loss of surface area by the sheet that is required for ice continuity, and distinguishes the types of dynamic breakup.

46-1872
Role of thermal convection in heat and mass transport in the subarctic snow cover.
Sturm, M., *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Oct. 1991, CR 91-19, 82p., ADA-243 674, Refs. p.67-72. For Ph.D. thesis of same title see 45-505.
Metamorphism (snow), Air flow, Convection, Depth hoar, Snow cover, Thermal conductivity, Water vapor, Vapor transfer, Heat transfer, Mass transfer.
The purpose of this study was to investigate the role of air convection in moving heat and water vapor in snow. To detect convection, the three-dimensional temperature field in the Fairbanks snow cover was measured hourly three winters (1985-1987). Measurements of snow density, compaction, and grain size were made monthly to determine the water vapor flux and textural changes. The snow metamorphosed into depth hoar, producing a sequence of five layers, including a basal layer with horizontal c-axes. C-axes in the overlying layers were vertical or randomly oriented. As the depth hoar developed, its air permeability increased to a value several times higher than previously measured for any snow, while the number of snow grains per unit volume decreased by an order of magnitude as a few select grains grew while others sublimated away. Simultaneously, there was a net transfer of mass from the base to the top of the snow due to mass flux gradients that averaged .000003 kg m2 s-m, but were occasionally 10 times higher. Convection occurred sporadically in the winter of 1984-85 and continuously in the winters of 1985-86 and 1986-87. The evidence was 1) simultaneous warming and cooling at different locations in a horizontal plane in the snow, and 2) horizontal temperature gradients of up to 16 C/m. The convection was time-dependent, with perturbations such as high wind or rapid changes in air temperature triggering periods when horizontal temperature gradients were strongest, suggesting these were also periods when the air flow was fastest. During the winter, warm and cold zones developed in the snow and remained relatively fixed in space. The zones were probably the result of a diffuse plume-like convection pattern linked to spatial variations in the temperature of the snow/soil interface. Air flow was inferred to have been horizontal near the base of the snow and vertical elsewhere. Flow averaged 0.2 mm/s, with a maximum of 2 mm/s. During average flow conditions, convection moved about a third of the total heat, but did not move significant mass. However, the coincidence of crystals with horizontal c-axes and the horizontal flow lines at the base of the snow suggest that convection may have affected crystal growth direction.

46-1873
Energy absorption of graphite/epoxy plates using Hopkinson bar impact.
Dutta, P.K., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Oct. 1991, CR 91-20, 18p., ADA-244 256, 13 refs.
Hui, D., Altamirano, M.R.
Composite materials, Low temperature tests, Damage, Wave propagation, Temperature effects, Velocity.
This work summarizes the analytical and experimental study on the energy absorption of quasi-isotropic graphite epoxy composite plates due to the impacting hemispherical penetrator in a Hopkinson bar apparatus. The mechanics of stress wave propagation through the bar and the composite laminate plate are discussed to predict the phenomenological process involved. The experimental data provided the results in terms of force, velocity, and energy of impact at all times during the penetration process occurring in microseconds. It has been concluded that loss of contact occurs frequently during the penetration process due to the stress wave reflections back and forth in the thickness direction. The damage process seemed to be both velocity and temperature dependent. Below a certain transition velocity the laminate absorbs less energy at low temperature than at high temperature. The reverse is true above this transition velocity. The mechanism of failure tends to change with impact velocity in such a way that progressively less energy is absorbed at higher velocities.

46-1874
Carbon and mineral transport in major North American, Russian Arctic, and Siberian Rivers: the St. Lawrence, the Mackenzie, the Yukon, the Arctic Alaskan rivers, the Arctic Basin Rivers in the Soviet Union, and the Yenisei.
Telang, S.A., et al, Biogeochemistry of major world rivers. Edited by E.T. Degens et al, Guildford, Great Britain, John Wiley & Sons, 1991, p.75-104, SCOPE 42, Refs. p.101-104.
River flow, Hydrogeochemistry, Geochemical cycles, Water chemistry, Ion density (concentration), Sediment transport, Runoff, River basins, Minerals.

46-1875
Freeze-thaw durability of cast stone.
Kaskel, B., et al, *Concrete international*, Nov. 1991, 13(11), p.32-37, 8 refs.
Wonneberger, B., Bortz, S.
Precast concretes, Concrete durability, Freeze thaw tests, Air entrainment, Cold weather performance, Masonry, Mortars, Construction materials.

46-1876
Sorted circles, relative-age dating and palaeoenvironmental reconstruction in an alpine periglacial environment, eastern Jotunheimen, Norway: lichenometric and weathering-based approaches.
Cook-Talbot, J.D., *Holocene*, 1991, 1(2), p.128-141, Refs. p.139-141.
Periglacial processes, Patterned ground, Age determination, Paleoclimatology, Weathering, Lichens, Geomorphology, Accuracy.

46-1877
Mass balance of the Greenland ice sheet: sensitivity to climate change as revealed by energy-balance modelling.
Oerlemans, J., *Holocene*, 1991, 1(1), p.40-49, 20 refs.
Ice sheets, Glacier mass balance, Paleoclimatology, Climatic changes, Glacier heat balance, Surface energy, Insolation, Global warming, Models, Greenland.

46-1878
Isotopic effects on the decay kinetics of the 385-nm luminescence from electron-irradiated ice.
Vernon, C.F., et al, *Journal of physical chemistry*, Sep. 19, 1991, 95(19), p.7313-7319, 31 refs.
Matich, A.J., Quickenden, T.I., Sangster, D.F.
Ice physics, Ice spectroscopy, Ionization, Luminescence, Radiation absorption, Isotopes, Low temperature research, Proton transport, Deuterium oxide ice.

46-1879
Inflight icing and the helicopter. *Helicopter safety*, Nov.-Dec. 1990, 16(6), p.1-3, Extracted from Flightfax.
Aircraft icing, Helicopters, Performance, Safety.

46-1880
On the nucleation of ice in highly supersaturated regions of clouds.
Baker, B.A., *Journal of the atmospheric sciences*, Aug. 15, 1991, 48(16), p.1904-1907, 16 refs.
Cloud physics, Supersaturation, Ice nuclei, Temperature effects, Ice crystal growth, Distribution, Heterogeneous nucleation.

46-1881
Stratigraphic and paleoclimatic studies of a 5500-year-old moss bank on Elephant Island, Antarctica.
Björck, S., et al, *Arctic and alpine research*, Nov. 1991, 23(4), p.361-374, 43 refs.
Peat, Active layer, Arctic landscapes, Mosses, Paleoclimatology, Stratigraphy, Paleoecology, Permafrost, Antarctica—Elephant Island.
Analyses of a core from the deepest known moss peat bank in Antarctica, on Elephant Island, South Shetlands, show that this *Chorisodontium aciphyllum*-dominated bank began to grow ca. 5500 C-14 yr BP. Combined with other studies in the region, the present study indicates more extensive glaciation before 5000 to 6000 BP than today on some of the South Shetland Is. The main hypothesis is that these frozen moss banks contain important paleoclimatic information. The stratigraphic parameters analyzed included degree of humification, organic and mineral matter content, bulk density, chronology, volumetric growth and organic accumulation rates, and finally magnetic analyses to detect tephra horizons. A discussion of the interrelationships between these parameters is followed by theoretical calculations of annual net primary productivity combined with multivariate analysis of the data set. The data suggest that the periods with the coldest summers (and possibly also winters) prevailed at the earliest stage of the moss bank development, at ca. 3500 BP, and 2500 BP. (Auth. mod.)

46-1882
Effects of snow-free period on the phenology of alpine plants inhabiting snow patches.
Kudo, G., *Arctic and alpine research*, Nov. 1991, 23(4), p.436-443, 22 refs.
Phenology, Snow cover effect, Plant ecology, Alpine landscapes, Vegetation patterns, Growth.

46-1883
Regional characteristics of the maximum depth of snow cover in Japan.
Ito, T., *Natural disaster science*, 1985, 7(1), p.25-39, 12 refs.
Snow depth, Snow accumulation, Distribution, Statistical analysis, Periodic variations, Correlation, Avalanche forecasting, Japan.

46-1884
Researches on hail embryo in southern Ningxia.
Chen, Y.S., et al, *Chinese journal of atmospheric sciences*, 1990, 14(3), p.371-376, 6 refs.
Niu, S.J.
Hailstone growth, Hailstone structure, Thin sections, Classifications, Microstructure, Precipitation (meteorology).

46-1885
How ice prediction systems cut agency costs. *Better roads*, Apr. 1991, 61(4), p.34-36.
Road icing, Road maintenance, Salting, Ice forecasting, Cost analysis, Safety.

46-1886
Technology that improves winter maintenance. *Better roads*, June 1991, 61(6), p.19-21.
Road maintenance, Winter maintenance, Road icing, Ice control, Ice forecasting, Cost analysis.

46-1887
What state DOT reports say about deicers. *Better roads*, June 1991, 61(6), p.23-24.
Road icing, Salting, Ice removal, Environmental impact, Cost analysis, Materials.

46-1888
Environmental facts about calcium chloride. *Better roads*, June 1991, 61(6), p.26,30.
Road icing, Ice removal, Salting, Environmental impact.

46-1889
ICETOW: towing instruments in ice-covered seas.
Lebans, G.A.G., et al, *Sea technology*, Nov. 1991, 32(11), p.35-41.
Clarke, R.A., Stewart, P.L.
Marine transportation, Oceanography, Ice navigation, Floating structures, Equipment, Ice cover effect, Performance, Design.

46-1890
Inversion of airborne electromagnetic survey data for sea-ice keel shape.
Liu, G.M., et al, *Geophysics*, Dec. 1991, 56(12), MP 2995, p.1986-1991, 13 refs.
Kovacs, A., Becker, A.
Sea ice, Ice cover thickness, Sounding, Electromagnetic prospecting, Aerial surveys, Ice bottom surface, Accuracy, Ice water interface, Analysis (mathematics).
It is possible to interpret conventional airborne electromagnetic (EM) data acquired over ice-covered arctic seas to obtain values of the sea ice thickness and, where needed, the actual sea ice keel geometry. To do so, high-frequency (inductive limit) data are required that permit the assumption that the ice is virtually transparent to the EM fields while the sea water forms a perfect conductor. Practically, a 100 kHz operating frequency is needed, but data acquired at a lower frequency can be scaled to obtain the required inductive limit anomaly. The data inversion is done by linking Occam's inversion method to a rapid numerical two-dimensional forward solution for the ice keel problem. Tests on synthetic data show a possible worst-case ice thickness error of about 15%. The results of inversion tests for two sets of survey data acquired near Prudhoe Bay, AK, also indicate an accuracy of this order. While some portion of the inversion error must be ascribed to the roughness constraint and is therefore inherent in the inversion technique used, the remainder must be ascribed to the instrumentation and is probably remediable.

46-1891
Sounding sea ice thickness using a portable electromagnetic induction instrument.
Kovacs, A., et al, *Geophysics*, Dec. 1991, 56(12), MP 2996, p.1992-1998, 12 refs. For another version see 46-717.
Morey, R.M.
Sea ice, Ice cover thickness, Sounding, Electromagnetic prospecting, Portable equipment, Remote sensing, Performance, Electrical resistivity.
Field trials using a man-portable, commercially available electromagnetic induction (EMI) sounding instrument, with a plug-in data processing module for the remote measurement of sea ice thickness, are discussed. The processing module was made to allow for the direct determination of sea ice thickness and to show the result in a numerical display. The processing module system was capable of estimating ice thickness within 10% of the true value for ice from about 0.7 to 3.5 m thick, the thickest of undeformed ice in the study area. However, since seawater under the arctic pack ice has a relatively uniform conductivity (2.55 +/- 0.05 S/m), a simplified method can be used for estimating sea ice thickness using just an EMI instrument. This technique uses only the EMI conductivity measurement, is easy to put into use, and does not rely on theoretically derived look-

up tables or phasor diagrams, which may not be accurate for the conditions of the area

46-1892
Changes in microstructure of snow under large deformations.
Edens, M.Q., et al, *Journal of glaciology*, 1991, 37(126), p.193-202, 17 refs.
Brown, R.L.
Snow mechanics, Snow deformation, Microstructure, Snow compression, Stress concentration, Bearing strength, Analysis (mathematics), Grain size, Mechanical tests.

46-1893
On the relationship between neck length and bond radius during compression of snow.
Brown, R.L., et al, *Journal of glaciology*, 1991, 37(126), p.203-208, 10 refs.
Edens, M.Q.
Snow mechanics, Snow deformation, Snow compression, Microstructure, Grain size, Analysis (mathematics), Plastic deformation.

46-1894
Holocene paleoenvironmental reconstruction from deep ground temperatures: a comparison with paleoclimate derived from the *delta*O-18 record in an ice core from the Agassiz Ice Cap, Canadian Arctic Archipelago.
Taylor, A.E., *Journal of glaciology*, 1991, 37(126), p.209-219, 32 refs.
Paleoclimatology, Well logging, Geothermy, Drill core analysis, Soil temperature, Surface temperature, Climatic changes, Ice cores, Isotope analysis, Correlation, Canada Queen Elizabeth Islands.

46-1895
Topology of ice-sheet centres.
Nye, J.F., *Journal of glaciology*, 1991, 37(126), p.220-227, 14 refs.
Ice sheets, Stability, Topographic features, Ice deformation, Surface structure, Analysis (mathematics), Ice edge, Glaciology.

46-1896
Thermal response of downhill skis.
Colbeck, S.C., et al, *Journal of glaciology*, 1991, 37(126), MP 2997, p.228-235, 12 refs.
Warren, G.C.
Skis, Ice solid interface, Sliding, Plastics snow friction, Heat flux, Temperature measurement, Thermal conductivity, Surface temperature, Thermal analysis.
The temperatures in downhill skies were measured with thermocouples to investigate the heat generation associated with the sliding of skis on snow. In these tests the effects on ski temperature of the ambient snow temperature, snow type, speed, load and thermal conductivity were investigated. A significant temperature rise at the base of the ski was found at the onset of motion in all runs. The temperature rise increased for heavier loads and at lower ambient temperatures. Some ski runs lasted long enough to observe a steady-state temperature at the ski base; it increased with ambient temperature. Longitudinal and transverse temperature variations occurred and were sensitive to snow hardness and skiing technique. Also investigated was heat flow through the cross-section of the ski with a finite-element model to determine the effects of ski structure on heat retention at the base. The authors found that the thermal characteristics as determined by the structure of the ski had a significant effect on the temperature at the ski base. At lower temperatures it is expected that friction will be greater in skis which have a large aluminum plate across their base. Steel edges have a lesser effect.

46-1897
Length, width and slope influences on glacier surging.
Clarke, G.K.C., *Journal of glaciology*, 1991, 37(126), p.236-246, 14 refs.
Glacier surges, Glacier surveys, Statistical analysis, Glacier surfaces, Glacier mass balance, Topographic effects, Theories, Glacial hydrology, Slope orientation, Analysis (mathematics).

46-1898
Ice physical properties, structural characteristics and stratigraphy in Hobson's Choice Island and implications for the growth history of East Ward Hunt Ice Shelf, Canadian High Arctic.
Jeffries, M.O., et al, *Journal of glaciology*, 1991, 37(126), p.247-260, 36 refs.
Serson, H.V., Krouse, H.R., Sackinger, W.M.
Ice islands, Ice cores, Ice shelves, Microstructure, Ice growth, Stratigraphy, Mass balance, Physical properties, Drill core analysis, Canada Northwest Territories Ellesmere Island.

46-1899
Polythermal conditions in arctic glaciers.
Blatter, H., et al, *Journal of glaciology*, 1991, 37(126), p.261-269, 15 refs.
Hutter, K.
Glacier mass balance, Thermal regime, Ice temperature, Temperature measurement, Temperature gradients, Thermal analysis, Mathematical models, Thermodynamics.

46-1900
Crack-fabrication techniques and their effects on the fracture toughness and CTOD for fresh-water columnar ice.
Wei, Y., et al, *Journal of glaciology*, 1991, 37(126), p.270-280, 30 refs.
DeFranco, S.J., Dempsey, J.P.
Ice strength, Microstructure, Ice cracks, Cracking (fracturing), Mechanical tests, Crack propagation, Accuracy, Laboratory techniques, Anisotropy.

46-1901
Laboratory experiments on the dynamics of powder-snow avalanches in the run-out zone.
Hermann, F., et al, *Journal of glaciology*, 1991, 37(126), p.281-295, 20 refs.
Hutter, K.
Avalanche modeling, Avalanche mechanics, Simulation, Turbulent flow, Turbulent boundary layer, Avalanche tracks, Velocity measurement, Mechanical tests.

46-1902
Numerical simulation of supraglacial heat advection and its influence on ice melt.
Moore, R.D., *Journal of glaciology*, 1991, 37(126), p.296-300, 15 refs.
Glacier melting, Glacier heat balance, Ice air interface, Advection, Surface energy, Runoff, Heat balance, Heat transfer, Rain, Mathematical models.

46-1903
Spatial and temporal variations of methane flux from subarctic/northern boreal fens.
Moore, T., et al, *Global geochemical cycles*, Mar. 1990, 4(1), p.29-46, 29 refs.
Roulet, N.T., Knowles, R.
Soil chemistry, Soil water, Swamps, Gases, Wetlands.

46-1904
Investigation of ship manoeuvrability in ice; phase I.
Menon, B.C., et al, *Transport Canada. Publication*, Sep. 1991, TP 10922E, 106p. + appends., With French summary. 32 refs.
Glen, I.F., Steele, M., Hardiman, K.
Icebreakers, Ice navigation, Ice breaking, Ice loads, Metal ice friction, Tests, Mathematical models.

46-1905
Ice jams and flood forecasting, Hay River, N.W.T.—Phase 2: surges and interactive computer program.
Gerard, R., et al, *University of Alberta, Edmonton. Department of Civil Engineering. Water resources engineering report*, June 1990, No.90-4, 146p., 6 refs.
Hicks, F., Jasek, M.
Ice jams, Flood forecasting, Ice breakup, River flow, River ice, Computer programs, Mathematical models, Canada Northwest Territories Hay River.

46-1906
Salt oscillator in the glacial Atlantic? 2. A "scale analysis" model.
Birchfield, G.E., *Paleoceanography*, Dec. 1990, 5(6), p.835-843, 22 refs.
Ice sheets, Ice melting, Salinity, Meltwater, Ice volume, Mathematical models, Heat flux.

46-1907
Meltwater and precipitation runoff to the North Atlantic, Arctic, and Gulf of Mexico from the Laurentide Ice Sheet and adjacent regions during the Younger Dryas.
Teller, J.T., *Paleoceanography*, Dec. 1990, 5(6), p.897-905, 42 refs.
Meltwater, Runoff, Climatic changes, Ice sheets.

46-1908
Lightweight mobile work shelter for cold weather and remote sites.
U.S. Naval Civil Engineering Laboratory, Port Hueneme, CA, *NCEL techdata sheet*, Nov. 1991, No.91-04, 2p.
Portable shelters, Cold weather survival, Cold weather operation, Logistics.

46-1909
Cryosphere/ocean interactions at the margin of the Laurentide Ice Sheet during the Younger Dryas chron: SE Baffin Shelf, Northwest Territories.
Andrews, J.T., et al, *Paleoceanography*, Dec. 1990, 5(6), p.921-935, 53 refs.
Ice sheets, Ice water interface, Glacial geology, Radioactive age determination, Sediments.

46-1910
Age and origin of the "Younger Dryas climate event" in Greenland ice cores.
Fairbanks, R.G., *Paleoceanography*, Dec. 1990, 5(6), p.937-948, 37 refs.
Ice cores, Radioactive age determination, Climatic changes.

46-1911
Geophysical studies of the west antarctic rift system.
Behrendt, J.C., et al, *Tectonics*, Dec. 1991, 10(6), p.1257-1273, Refs. p.1272-1273.
Topographic surveys, Ice surface, Ice cover thickness, Geophysical surveys, Antarctica West Antarctica.
The west antarctic rift system extends over a 3000 x 750 km, largely ice covered area from the Ross Sea to the base of the Antarctic Peninsula, comparable in area to the Basin and Range and the East African rift system. A spectacular rift shoulder scarp along which peaks reach 4-5 km maximum elevation marks one flank and extends from northern Victoria Land-Queen Maud Mountains to the Ellsworth-Whitmore-Horlick Mountains. The rift shoulder has maximum present physiographic relief of 5 km in the Ross Embayment and 7 km in the Ellsworth Mountains-Byrd Subglacial Basin area. The Transantarctic Mountains part of the rift shoulder (and probably the entire shoulder) has been interpreted as rising since about 60 Ma, at episodic rates of about 1 km/m.y., most recently since mid-Pliocene time, rather than continuously at the mean rate of 100 m/m.y. The rift system is characterized by bimodal alkaline volcanic rocks ranging from at least Oligocene to the present. These are exposed asymmetrically along the rift flanks and at the south end of the Antarctic Peninsula. (Auth. mod.)

46-1912
Glaciers of the Swiss Alps 1981/82 and 1982/83. [Die Gletscher der Schweizer Alpen 1981/82 und 1982/83].
Aellen, M., et al, *Schweizerische Akademie der Naturwissenschaften. Gletscherkommission. Jahrbuch. Bericht*, 1991, No.103/104, 141p., In German and French with English summary. 31 refs.
Herren, E.
Glacier surveys, Glacier oscillation, Mountain glaciers, Glacier mass balance, Switzerland.

46-1913
Evolution of sedimentation in Scoresby Sund, East Greenland during the Holocene. [Holozäne Sedimentationsentwicklung im Scoresby Sund, Ost-Grönland].
Marienfeld, P., *Berichte zur Polarforschung*, 1991, No.96, 162p., In German with English summary. Refs. p.98-105.
Bottom sediment, Glacial deposits, Paleoclimatology, Ocean bottom, Marine deposits, Ice rafting, Sedimentation, Stratigraphy, Drill core analysis, Greenland.

46-1914
Hydrodynamics of an arctic fjord. Field study, Affarlikassaa, West Greenland. Resonance of internal seiches and buoyancy-driven circulation.
Möller, J.S., *Technical University of Denmark, Lyngby. Institute of Hydrodynamics and Hydraulic Engineering. Series paper*, 1984, No.34, 197p., With Danish summary. 50 refs.
Ice cover effect, Ice water interface, Water flow, Water waves, Tidal currents, Hydrodynamics, Hydrography, Mathematical models, Coastal topographic features, Greenland.

46-1915
Radioisotope stratigraphy, sedimentology and geochemistry of early Quaternary sediments from the eastern Arctic Ocean. [Radioisotopenstratigraphie, Sedimentologie und Geochemie jungquartärer Sedimente des östlichen Arktischen Ozeans].
Bohrmann, H., *Berichte zur Polarforschung*, 1991, No.95, 133p., In German with English summary. Refs. p.103-113.
Bottom sediment, Quaternary deposits, Paleoclimatology, Glacial deposits, Ocean bottom, Ice rafting, Radioactive age determination, Geochemistry, Stratigraphy.

46-1916
Energy exchanges and ablation rates on the debris-covered Rakhiot Glacier, Pakistan.
Mattson, L.E., et al, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(1), p.17-32, With German summary. 15 refs.
Gardner, J.S.
Glacier ablation, Glacier surveys, Sediments, Glacier heat balance, Heat flux, Surface energy, Glacial geology, Meteorological factors, Pakistan.

46-1917
Modeling glacier fluctuations in the Sör Rondane, Dronning Maud Land, Antarctica.
Pattyn, F., et al, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(1), p.33-47, With German summary. 14 refs.
Huybrechts, P., Decleir, H.
Glacier oscillation, Ice sheets, Glacial geology, Glacial deposits, Paleoclimatology, Mathematical models, Mountain glaciers, Antarctica - Queen Maud Land.
Moraine deposits found above the present glacier surface in the central Sör Rondane Mountains give evidence of former glaciations. In this paper, an attempt is made to interpret these observed glacier fluctuations in terms of environmental change. To do this, a numerical flowline model, taking into account thermodynamics and a coupled ice shelf, has been developed and is applied to two outlet glaciers through the mountain range, *Gunnestadbreen and Jenningsbreen*. It is found that lower ice temperatures, reduced accumulation, and a drop in sea level corresponding to typical glacial conditions account for a 150-200 m rise in glacier level. From a comparison of these results with a palaeogeographical reconstruction for a "maximum" glacial stage for Jenningsbreen by Hirakawa et al. (1989) it is argued that their moraine deposits relate to an earlier Cenozoic glaciation involving a full-grown ice sheet. (Auth.)

46-1918
Effect of glacier wind on local climate, turbulent heat fluxes and ablation.
Ohata, T., *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(1), p.49-68, With German summary. 26 refs.
Glacier ablation, Wind factors, Glacial meteorology, *Ice heat flux, Turbulent boundary layer*, Ice air interface, Glaciology, Air temperature.

46-1919
Mass balance series of the Stubacher Sonnblickkees 1958/59 to 1987/88—computation of the mass balance 1980/81 to 1987/88 and 1958/59 to 1962/63. [Die Massenbilanzmessreihe vom Stubacher Sonnblickkees 1958/59 bis 1987/88 Die Berechnung der Massenbilanz 1980/81 bis 1987/88 und 1958/59 bis 1962/63],
Slupetzky, H., *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(1), p.69-89, In German with English summary. 20 refs.
Glacier mass balance, Glacier oscillation, Measurement, Glacier surveys, Glaciology.

46-1920
Mass budget of Filleckkees (Stubach Valley, Hohe Tauern) 1979-1988. [Massenhaushaltswerte vom Filleckkees (Stubachtal, Hohe Tauern) 1979-1988],
Slupetzky, H., *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(1), p.91-96, In German with English summary. 5 refs.
Glacier mass balance, Measurement, Glacier surveys, Correlation, Glacier oscillation, Periodic variations.

46-1921
Explanatory note on the map "Glaciers at Kitzsteinhorn 1982" 1:5000. [Begleitworte zur Karte "Gletschergebiet Kitzsteinhorn 1982" 1:5000],
Slupetzky, H., et al, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(1), p.97-110, In German with English summary. 17 refs.
Puruckherr, R.
Glacier mass balance, Topographic maps, Glacier surveys, Glacier surfaces, Photogrammetric surveys.

46-1922
Comments on a map of the Ödenwinkel Glacier forefield 1:5000. [Erläuterungen zur Karte des Ödenwinkelkees-Vorfeldes 1:5000],
Slupetzky, H., et al, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(1), p.111-122, In German with English summary. 12 refs.
Aschenbrenner, J., Hammerle, H.
Glacier mass balance, Topographic maps, Glacier surveys, Glacier surfaces, Photogrammetric surveys, Moraines.

46-1923
Contribution to knowledge of the vertical movement component of the ice supply of the Pasterze Glacier. [Ein Beitrag zur Kenntnis der vertikalen Bewegungskomponente und des Eisnachschubs an der Pasterze],
Tintor, W., et al, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(1), p.131-137, In German. 9 refs.
Wakonigg, H.
Glacier mass balance, Glacier oscillation, Glacier ablation, Periodic variations.

46-1924
Terminus of Chogo-Lungma Glacier in 1989. [Bericht 1989 über das Chogo-Lungma-Gletscherende im Karakorum],
Kick, W., *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(1), p.139-145, In German with English summary. 9 refs.
Glacier oscillation, Glacier surveys, Glacier mass balance, Photogrammetric surveys, Periodic variations.

46-1925
Basal stress distribution of ice stream E, Antarctica inferred by control methods.
MacAyeal, D.R., *Journal of geophysical research*, Jan. 10, 1992, 97(B1), p.595-603, 14 refs.
Rheology, Imaging, Spaceborne photography, Flow rate, Ice surface, Velocity measurement, Basal sliding, Antarctica—West Antarctica.
The irregular spatial distribution and velocity independence of basal friction derived from Landsat measured surface velocity suggest that ice stream flow is not controlled by the properties *of a deformable basal till alone. Rigid bedrock substrata may* contact the base of the ice stream in small (< 100 sq km) areas where the velocity field displays strong vorticity and where the ice stream surface appears rumpled in Landsat images. (Auth.)

46-1926
Seasonal and interannual fluctuations in ice exchange between the Arctic Basin and the straits of the Canadian Archipelago.
Mironov, E.U., et al, *Polar geography and geology*, Apr.-June 1991, 15(2), p.132-143, Translation of Izvestiia Vsesoiuznogo geograficheskogo obshchestva 122(6):544-553, 1990. 21 refs.
Uralov, N.S.
Sea ice distribution, Drift, Seasonal variations.

46-1927
Environment and age of marginal formations of the last ice sheet in the southeastern Kola Peninsula.
Bakhmutov, V.G., et al, *Polar geography and geology*, Apr.-June 1991, 15(2), p.144-153, Translation of Geomorfologiia, No.2:52-59, 1991. 6 refs.
Ice sheets, Ice structure, Ice dating, Age determination, USSR—Kola Peninsula.

46-1928
Climatic conditions in areas with glaciers in the western sector of the Arctic and the Tyan'-Shan' during the last millennium (a reconstruction based on dendrochronology).
Adamenko, V.N., et al, *Polar geography and geology*, Apr.-June 1991, 15(2), p.154-166, Translation of Izvestiia Vsesoiuznogo geograficheskogo obshchestva 123(3):216-225, 1991.
IUrchenko, IU.A.
Climate, Glaciers, Age determination, Trees (plants).

46-1929
Kinematics of sea ice and atmospheric conditions in the Antarctic.
Enomoto, H., *Zürcher geographische Schriften*, 1991, No.42, 185p., Refs. p.167-172.
DLC GB 2597.E56 1991
Sea ice distribution, Seasonal variations, Atmospheric circulation, Atmospheric pressure.
The relationships between the atmosphere and sea ice conditions around Antarctica are discussed. The main features of the annual and intra-annual variations in the state of the sea ice are derived from satellite data, and these are used to describe the mechanisms which relate annual sea ice changes to atmospheric circulation. The major result of this study is the discovery of the six month periodicity in the lower tropospheric circulation which is neither obvious nor dominant. This less conspicuous periodic change in circulation, however, exerts an important effect on the seasonal variations in ice conditions, especially the area covered, which in turn produces an important effect on the antarctic climate. The circulation component is identified as the atmospheric convergence line which generally follows or is to the north of the antarctic periphery, with seasonal movements following changes in sea level pressure.

46-1930
SCAR bulletin No.102, July 1991.
Scientific Committee on Antarctic Research, *Polar record*, July 1991, 27(162), p.273-283.
Meetings, Research projects, Sea ice, Climate.
This issue contains reports made to SCAR by several specialists groups when they met in São Paulo, Brazil in July 1990. In these reports, the progress and current state of research, program details, funding, research directions, and recommendations are provided. Groups represented at these meetings include Environmental Affairs and Conservation, BIOMASS Executive, Seals, Southern Ocean Ecology, Antarctic Sea Ice, Antarctic Climate Research, Evolution of the Cenozoic Palaeoenvironments of the Southern High Latitudes (GOSC), and Structure and Evolution of the Antarctic Lithosphere

46-1931
SCAR bulletin No.103, Oct. 1991.
Scientific Committee on Antarctic Research, *Polar record*, Oct. 1991, 27(163), p.373-375.
Research projects, Stations.
A list is provided of names and geographic coordinates of stations of SCAR nations operating in the Antarctic during the winter 1991. Accompanying the list is a two page line drawing sketch map of Antarctica showing these stations in relation to each other. Insets show the oceanic stations north of 60S and on heavily populated King George I.

46-1932
Poles apart, science thrives on thin ice.
Palca, J., *Science*, Jan. 17, 1992, 255(5042), p.276-278.
Research projects, Ice sheets.
The author comments on the state of research in both polar regions and concludes that, though somewhat reduced by decreasing funding, research is still vigorous. Besides the money crunch, three other factors tend to introduce difficulties into cold regions research programs: the dissolution of the Soviet Union; the closing/drawdown of military facilities in arctic and antarctic regions; and the increased influence of the EPA with its strong emphasis on protection of the polar environments. Several examples of the importance of polar research are cited.

46-1933
Oxygen supersaturation in ice-covered antarctic lakes: biological versus physical contributions.
Craig, H., et al, *Science*, Jan. 17, 1992, 255(5042), p.318-321, 7 refs.
Wharton, R.A., Jr., McKay, C.P.
Lake ice, Water chemistry, Limnology, Antarctica
Hoare, Lake.
Freezing in ice-covered lakes causes dissolved gases to become supersaturated while at the same time removing gases trapped in the ablating ice cover. Analysis of N2, O2, and Ar in bubbles from Lake Hoare ice shows that while O2 is about 2.4 times supersaturated in the water below the ice, only 11% of the O2 *input to this lake is due to biological activity. 89% of the O2* is derived from meltwater inflow. Trapped bubbles in a subliming ice cover provide a natural "fluxmeter" for gas exchange. In Lake Hoare as much as 70% of the total gas loss may occur by advection through the ice cover, including about 75% of the N2, 59% of the O2, and 57% of the Ar losses. The remaining gas fractions are removed by respiration at the lower boundary (O2) and by molecular exchange with the atmosphere in the peripheral summer moat around the ice. (Auth.)

46-1934
Repeated compression-annealing experiments on anisotropic core ice.
Huang, M.H., et al, *Antarctic research*, June 1991, 2(1), p.22-29, 12 refs.
Wang, W.T., Li, J., Li, G.
Strain tests, Orientation, Grain size, Recrystallization.
Three runs (6 samples) of repeated uniaxial compression annealing experiments were conducted on a creep testing machine *with a loading accuracy of* 1% at -2 +/- 0.2 C. The tested samples were cut from BHQ ice core. Results show that under warm temperature and large load, the initial features of structure and fabric disappear, a small circle girdle fabric with fine equigranular grains appears, and a multi-maxima fabric develops to some extent. Analysis of structure and fabric shows that the formation mechanism of new fabrics in these experiments is principally recrystallization. With the repetition of compression-annealing, the differences in the fabric of the six samples are reduced, their rheological behavior tends to be uniform, and their grain size decreases towards a steady state value. (Auth. mod.)

46-1935
Ecological observations on coloured layer of coastal fast ice in Great Wall Bay, King George Island, Antarctica.
Lu, P.D., et al, *Antarctic research*, June 1991, 2(1), p.39-45, 23 refs.
Zhang, K.C., Huang, F.P., Watanabe, K.
Colored ice, Algae, Sea ice, Ice composition, Antarctica—Great Wall Station.
Marine biological and environmental investigations of ice and coastal waters off the Great Wall Station were carried out from Nov. 17, 1988 to Mar. 3, 1989. The fast ice covered the inner part of the Great Wall Bay until mid-Dec., with the ice thickness ranging from 90 to 70 cm, including 20 cm of snow cover. A 5 cm brown layer occurred in the middle part of an ice core collected on Nov. 20, and two brown layers occurred in the interior of ice cores collected on Nov. 17, 20 and 26. In comparison to the water column, chlorophyll-a concentration in fast ice was higher, ranging from 2.55 to 56.84 mg cu m, and occurring *in the middle layers of the ice rather than in bottom layers* as often observed in other coastal areas. Measurements of temperature, transparency, nutrients and *chlorophyll-a* in the water column are presented in tables. Microalgal assemblages in fast ice and in the water column of Great Wall Bay are reported. (Auth. mod.)

46-1936
Encyclopedia of earth system science.
Nierenberg, W.A., ed, San Diego, Academic Press, 1991, 4 vols., Refs. passim. For selected papers see 46-1937 through 46-1957 or A-45471, F-45472, F-45474, F-45476, F-45478, F-45479, I-45477, J-45473 and J-45475.
DLC QE5.E514 1991
Air ice water interaction, Sea ice, Global change, Ice sheets, Ocean currents, Climatic factors, Icebergs, Cloud electrification, Glacial lakes, Antarctica.
This 4-volume set contains a general article on Antarctica as well as 7 other articles dealing with that continent on such topics as climate-ice interactions, the impact of deglaciation on ocean circulation, Antarctic Bottom Water, icebergs, and the West Antarctic Ice Sheet. Each article consists of an outline that lists the main subject headings, a paragraph or series of paragraphs defining the primary subject of the article, the main text, bibliographic references, and a glossary of significant terms in the context of their use in the article. The final feature of Vol.4 is a detailed subject index. (Auth.mod.)

46-1937
Air-sea-ice exchange processes.
Smith, S.D., Encyclopedia of earth system science, Vol.1. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.53-59, 7 refs.
Air ice water interaction, Sea ice, Pack ice, Icebergs, Heat flux, Water waves, Analysis (mathematics).

46-1938
Antarctica.
Weller, G., Encyclopedia of earth system science, Vol.1. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.89-100, 8 refs.
Ozone, Sea ice, Air pollution, Global change, Ice sheets, International cooperation, Boreholes, Antarctica.
Antarctica is a continent of 14 million square kilometers located in the Southern Hemisphere, surrounding the South Pole. A layer of ice up to 4 km thick lies over about 98 percent of its area. It is the coldest, highest, and driest continent on earth, surrounded by 18 sq km of pack ice each winter. In the total earth system, Antarctica's role is to act as one of the earth's "refrigerators," affecting both the global oceanic and atmospheric circulations. Its large ice sheet stores detailed records of past atmospheric chemistry and global climates, and contains enough water to raise global sea level by some 60 m. The antarctic ice sheet has affected the climate of the world and the development of terrestrial and marine biota. Present-day Antarctica provides unique conditions for investigating the effects of anthropogenic atmospheric pollutants, such as the greenhouse effect and the ozone hole. (Auth.)

46-1939
Arctic.
Weller, G., Encyclopedia of earth system science, Vol.1. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.101-111, 5 refs.
Climate, Ocean currents, Sea ice, Permafrost distribution, Global change, Ecology, International cooperation.

46-1940
Climate-ice interactions.
Barry, R.G., Encyclopedia of earth system science, Vol.1. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.517-524, 11 refs.
Snow cover effect, Ice cover effect, Climatic factors, Land ice, Ice volume, Sea ice, Permafrost, Glacier ice.
Snow and ice are significant elements of the hydrosphere that undergo marked seasonal and long-term changes in extent and thickness. Snow forms in the atmosphere and where it falls on land may persist as a snow cover or a glacier, whereas sea ice grows principally by freezing of water in bulk. The variability of snow and ice cover arises from the proximity of mean terrestrial temperature to the freezing point of water. The presence of snow and ice modifies the global climate system through a complex series of interactions. Data are provided on the ice volume in Antarctica and the extent of sea ice in the Southern hemisphere. (Auth.mod.)

46-1941
Deglaciation, impact on ocean circulation.
Jansen, E., Encyclopedia of earth system science, Vol.2. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.35-46, 16 refs.
Ocean currents, Meltwater, Salinity, Climatic changes.
The climate system responds in a nonlinear fashion to the climatic forcing imposed by increased insolation during deglaciations. The ocean is an important factor for determining this response. To understand the way climate changed during these transitions, it is necessary to understand the role of the oceans, including Antarctic Bottom Water, as a mediator of both gradual and abrupt climate change. (Auth.mod.)

46-1942
Electrification in winter storms.
Williams, E.R., Encyclopedia of earth system science, Vol.2. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.131-135, 6 refs.
Cloud electrification, Ice crystal growth, Ice crystal nuclei, Storms.

46-1943
Glacial lakes.
Elson, J.A., Encyclopedia of earth system science, Vol.2. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.347-360, 6 refs.
Glacial lakes, Pleistocene, Lacustrine deposits, Glacial deposits.

46-1944
Glaciotectonic structures and landforms.
Aber, J.S., Encyclopedia of earth system science, Vol.2. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.361-378, 8 refs.
Tectonics, Landforms, Ice cover effect, Glaciation.

46-1945
Ice age dynamics.
Maasch, K.A., Encyclopedia of earth system science, Vol.2. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.559-569, 5 refs.
Pleistocene, Ice age theory, Climatic changes, Carbon dioxide, Models.

46-1946
Icebergs.
Ackley, S.F., MP 2998, Encyclopedia of earth system science, Vol.2. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.571-582, 11 refs.
Icebergs, Origin, Drift, Iceberg towing.
Icebergs are the floating remnants of ice produced on the continents in glaciers, ice sheets, and ice shelves that originate as snow compressed into ice. They differ from sea ice, which also floats in the ocean in cold regions, in that sea ice is produced by the direct freezing of seawater. Icebergs are a unique part of the earth's hydrologic cycle. The cycle is initiated as oceanic evaporated moisture which is condensed, frozen, and deposited as snow precipitation on the continents and compressed into ice by a 100 m or so of overburden snow. The ice flows to the ocean in ice streams or glaciers that are driven by gravity and that densify and deform as the ice migrates (they behave as slowly moving rivers of ice). The cycle is completed by the ice breaking off into the sea as icebergs, which then melt slowly in the ocean. For the dominantly ice portion of the hydrologic cycle the time scales are typically from decades to thousands of years, compared with the annual or slightly longer time scales more typical of the water-based hydrologic cycle in lower latitudes. Icebergs in Antarctica, Greenland, Alaska, and other northern hemisphere regions are discussed in this article. (Auth.mod.)

46-1947
Paleoclimatic effects of continental collision and glaciation.
Kelley, P.H., et al, Encyclopedia of earth system science, Vol.3. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.543-550, 6 refs.
Raymond, A.
Glaciation, Paleoclimatology, Paleobotany.

46-1948
Polar regions, influence on climate variability and change.
LeDrew, E.F., Encyclopedia of earth system science, Vol.3. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.647-659, 10 refs.
Sea ice distribution, Ice cover effect, Snow cover effect, Global change, Climatic changes.
The fundamental theme of this article is the effect of the characteristics and spatial patterns of ice and snow, in the arctic as well as antarctic regions, on climate from a regional to a global scale. The physical processes affecting the variability and change of climate are highlighted. The study of the effect of this variability and change on other life and physical processes on this planet is a major component of the global change research agenda. (Auth.mod.)

46-1949
Polar stratospheric clouds.
Fahey, D.W., et al, Encyclopedia of earth system science, Vol.3. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.661-672, 10 refs.
Kawa, S.R.
Cloud physics, Aerosols, Stratosphere, Particles, Chemical composition, Lidar.
Polar stratospheric clouds (PSCs) are a special class of atmospheric aerosol that is observed in the winter stratosphere at high latitudes. The clouds are limited to the polar regions because of the combined requirement of very low temperatures and sufficient amounts of the condensing species, water vapor and nitric acid. The presence of PSCs has been documented by a variety of satellite, balloon, aircraft, and ground-based observations. The co-condensation of water and nitric acid produces PSC particles composed of the nitric acid trihydrate phase at temperatures several degrees above the frost point. Below the frost point, PSCs form as ice particles containing trace amounts of nitric acid and other impurities. Particle sizes range from fractions of a micrometer to several micrometers. The extensive and regular formation of PSCs affects both the chemical and radiative balance in the lower atmosphere. The chemical balance is altered by heterogeneous reactions on cloud particle surfaces that change the partitioning within the reservoirs of reactive chlorine and reactive nitrogen trace species. Release of reactive chlorine in these reactions and the removal of reactive nitrogen on sedimenting PSC particles leads to enhanced ozone depletion in high-latitude winter. Because of the radiative temperature difference between the ground and PSC layers, the presence of PSCs can result in significant cooling of the cloud layer and changes in transport circulation. (Auth.)

46-1950
Sea ice.
Weeks, W.F., Encyclopedia of earth system science, Vol.4. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.39-52, 13 refs.
Sea ice, Sea ice distribution, Ice microstructure, Ice models, Remote sensing, Ice formation.
Sea ice, any form of ice found at sea that originated from the freezing of seawater, has historically been the least studied of all the phenomena that have a significant effect on the surface heat balance of the earth. Because the logistic and operational problems that produced this neglect have recently lessened, considerable information is now available on the nature and behavior of this unusual material as well as its role in influencing the weather, the climate, and the oceanography of the arctic and antarctic regions and possibly of the planet as a whole. (Auth.mod.)

46-1951
Sea level fluctuations.
Peltier, W.R., Encyclopedia of earth system science, Vol.4. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.53-61, 9 refs.
Isostasy, Sea level, Ice melting.

46-1952
Sedimentary geofluxes, global.
Andrews, J.T., Encyclopedia of earth system science, Vol.4. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.93-101, 15 refs.
Glacial deposits, Sediments, Ice rafting.

46-1953
Snowmelt and the ionic pulse.
Bales, R.C., Encyclopedia of earth system science, Vol.4. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.199-207, 3 refs.
Snowmelt, Runoff, Ions, Ion density (concentration), Ice air interface.

46-1954
Soil water: liquid, vapor, and ice.
Black, P.B., MP 2999, Encyclopedia of earth system science, Vol.4. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.259-269, 4 refs.
Soil water, Adsorption, Capillarity, Ice water interface, Analysis (mathematics).

46-1955
Water geochemistry.
Kitano, Y., Encyclopedia of earth system science, Vol.4. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.449-462, 5 refs.
Water chemistry, Snow composition, Ice composition, Geochemistry, Metals.

46-1956
Weather and climate modification.
Dennis, A.S., Encyclopedia of earth system science, Vol.4. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.471-481, 4 refs.
Weather modification, Cloud seeding, Artificial nucleation, Ice nuclei, Silver iodide, Hail prevention.

46-1957
West Antarctic Ice Sheet.
Long, W.E., Encyclopedia of earth system science, Vol.4. Edited by W.A. Nierenberg, San Diego, Academic Press, 1991, p.493-502, 11 refs.
Ice sheets, Geography, History, Ecology, Global warming, Climatic changes, Sea level, Antarctica—West Antarctica.
The West Antarctic Ice Sheet is a marine ice sheet that includes Antarctica's great ice shelves. The ice sheet is nourished by snow accumulation and ablated dominantly by calving. Enigmatic ice streams are also common. Because marine ice sheets are delicately balanced ice bodies extremely susceptible to climatic and sea level changes, much investigation and interest are directed toward evaluating the history of the sheet and its relationship with the climate and the sea level.

46-1958
Shore-junctions of earth dams in permafrost. [Beregovye sopriazheniia gruntovykh plotin v usloviiakh vechnoĭ merzloty],
Belan, V.I., Moscow, Energoatomizdat, 1991, 125p., In Russian. 79 refs.
Earth dams, Joints (junctions), Permafrost beneath structures, Analysis (mathematics).

46-1959
Stabilization of permafrost in the foundations of buildings. [Stabilizatsiia vechnomerzlykh gruntov v osnovanii zdaniĭ],
Khrustalev, L.N., et al, Novosibirsk, Nauka, 1990, 208p., In Russian. 41 refs.
Nikiforov, V.V.
Permafrost beneath structures, Analysis (mathematics), Soil stabilization, Foundations.

46-1960
New paint and varnish materials from the *Oliva* company. [Novye lakokrasochnye materialy firmy *Oliva*].
Gavril'chik, L.D., et al, Prochnost' korpusa morskikh sudov i zashchita ot korrozii; sbornik nauchnykh trudov [Durability of ships' hulls and protection from corrosion; collected scientific papers]. Edited by V.I. Peresypkin, Moscow, Transport, 1990, p.65-68, In Russian.
Sominskaia, E.V., Bykovskaia, E.G.
Protective coatings, Corrosion, Ships, Countermeasures, Cold weather performance.

46-1961
Development and testing of domestic anti-corrosive enamels for the hulls of icebreakers and ice navigating ships. [Razrabotka i ispytaniia otechestvennykh emalei dlia zashchity ot korrozii korpusov ledokolov i sudov ledovogo plavaniia].
Moiseeva, I.P., et al, Prochnost' korpusa morskikh sudov i zashchita ot korrozii; sbornik nauchnykh trudov [Durability of ships' hulls and protection from corrosion; collected scientific papers]. Edited by V.I. Peresypkin, Moscow, Transport, 1990, p.85-98, In Russian.
Krasil'shchikova, B.L., Sominskaia, E.V., Tsvetkova, I.V.
Protective coatings, Countermeasures, Ships, Ice breakers, Corrosion, Low temperature tests.

46-1962
Using anti-corrosive paint and varnish coatings for the hulls of icebreakers and ice navigating ships. [Primenenie lakokrasochnykh pokrytii dlia zashchity ot korrozii korpusov ledokolov i sudov ledovogo plavaniia].
Krasil'shchikova, B.L., et al, Prochnost' korpusa morskikh sudov i zashchita ot korrozii; sbornik nauchnykh trudov [Durability of ships' hulls and protection from corrosion; collected scientific papers]. Edited by V.I. Peresypkin, Moscow, Transport, 1990, p.98-105, In Russian.
Sominskaia, E.V., Pliasova, L.S., Zobachev, IU.E.
Protective coatings, Countermeasures, Corrosion, Icebreakers, Ships.

46-1963
Humus of cold soils; ecological aspects. [Gumus kholodnykh pochv; ekologicheskie aspekty].
Chimitdorzhieva, G.D., Novosibirsk, Nauka, 1990, 144p., In Russian. Refs. p.138-144.
Soil composition, Soil conservation, Cryogenic soils, Soil formation, Soil profiles.

46-1964
Anthropogenesis of forest soils in southern Central Siberia. [Antropogenez lesnykh pochv iuga Srednei Sibiri].
Shugalei, L.S., Novosibirsk, Nauka, 1991, 184p., In Russian. Refs. p.171-184.
Forest soils, Soil formation, Cryogenic soils, Soil conservation, Soil physics.

46-1965
Review of the state of the natural environment in the USSR; according to data based on 1988-1989 observations. [Obzor sostoianiia okruzhaiushchei prirodnoi sredy v SSSR; po materialam nabliudenii 1988-1989 g.].
Izrael', IU.A., ed, Moscow, Gidrometeoizdat, 1990, 114p., In Russian.
Rovinskii, F.IA., ed.
Water pollution, Soil pollution, Surface waters, Air pollution, Snow impurities.

46-1966
Proceedings of the 48th annual Eastern Snow Conference, Guelph, Ontario, June 5-7, 1991.
Eastern Snow Conference, MP 3000, 1991, 344p., Refs. passim. For individual papers see 46-1967 through 46-1998.
Ferrick, M., ed, Pangburn, T., ed.
Snow surveys, Snow cover effect, Snow cover distribution, Snowmelt, Snow composition, Snow water equivalent, Runoff, Snow depth, Snowfall, Ice cover.

46-1967
Effects of crystal metamorphosis on the elution of chemical species from snow.
Hewitt, A.D., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, MP 3001, p.1-10, 9 refs.
Cragin, J.H., Colbeck, S.C.
Metamorphism (snow), Snow composition, Snowmelt, Water chemistry, Snow crystal growth, Ion density (concentration), Snow impurities, Chemical properties.
Columns of fresh snow were aged in a -20 C coldroom with an imposed thermal gradient of approximately 36 C/m for periods of one to eight weeks. Deionized distilled water was then passed through a column of this aged snow and the eluate collected in sequential aliquots for determination of H+, Cl-, NO3- and SO4 2-. Concentrations of these ions in the eluate show that both fractionation (higher concentrations in initial aliquots) and preferential elution (greater enrichment of SO4 2- relative to Cl-) in melting snow are strongly influenced by snow metamorphic processes.

46-1968
Improved method of predicting snowpack water equivalent.
Samelson, D., *Eastern Snow Conference. Proceedings*, 1991, 48th, p.11-24, 13 refs.
Snow water equivalent, Snowmelt, Runoff forecasting, Snow surveys.

46-1969
Area snow accumulation-ablation model (ASAAM): experience of real-time use in southwestern Ontario.
Schroeter, H.O., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, p.25-38, 18 refs.
Boyd, D.K., Whiteley, H.R.
Snow cover distribution, Snow accumulation, Snow depth, Snow surveys, Ablation, Computer programs, Flood forecasting.

46-1970
Terrain classification of snow-covered watersheds.
Elder, K., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, MP 3002, p.39-49, 17 refs.
Davis, R.E., Bales, R.C.
Terrain identification, Snow cover distribution, Watersheds, Snow surveys, Snow water equivalent, Snowmelt, Runoff forecasting, Topographic effects, Alpine landscapes, Mathematical models.
If the spatial distribution of snow can be estimated, it may be classified into areas, which may simplify snow melt calculations, melt water routing through the pack, and recovery of snow properties from remote sensing data. Complex topography produces spatially variable patterns of snow accumulation and ablation. The objective in this study is to develop an automated method that unambiguously divides a snow-covered watershed into terrain units that 1) do not overlap major subcatchment divides, 2) have similar net potential solar radiation within their boundaries, and 3) have relatively uniform snow water equivalence within their boundaries. It is shown that the number of classes delineated by this method will be orders of magnitude less than the number of nodes in a digital elevation model of even a small watershed, which can be on the order of 100,000 to 1,000,000. This method is developed in an alpine watershed whose landcover features are simple; it has little vegetation or soil cover. The method is suitable to distribute point energy balance calculations over a watershed.

46-1971
Snow depth/area relationships for various landscape units in southwestern Ontario.
Burkard, M.B., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, p.51-65, 20 refs.
Whiteley, H.R., Schroeter, H.O., Donald, J.R.
Snow cover distribution, Snow depth, Snow surveys, Topographic effects, Watersheds, Runoff forecasting.

46-1972
Digital investigation of Great Lakes regional snowfall, 1951-1980.
Norton, D.C., *Eastern Snow Conference. Proceedings*, 1991, 48th, p.67-80, 10 refs.
Snowfall, Snow surveys, Snow cover distribution, Data processing, Great Lakes.

46-1973
Water, energy, and biogeochemical budgets at Sleepers River, Danville, Vermont.
Shanley, J.B., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, p.81-90, 14 refs.
Denner, J.C., Sundquist, E.T.
Watersheds, Snowmelt, Runoff, Hydrogeochemistry, Research projects, Snow cover effect.

46-1974
Ionic mass balance for a small high arctic wetland basin during spring snowmelt.
Fraser, K.E., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, p.91-104, 16 refs.
Buttle, J.M., Adams, W.P., Ecclestone, M.A.
Wetlands, Snowmelt, Snow composition, Runoff, Water chemistry, Ion density (concentration), Active layer.

46-1975
SNOQUAL, a snow-meltwater quality model: a study of model variants.
Jones, H.G., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, p.105-118, 13 refs.
Stein, J., Sochanski, W.
Snowmelt, Snow composition, Snow impurities, Leaching, Water chemistry, Models.

46-1976
Verification of statistical forecast guidance for 1-day and 2-day mesoscale forecasts of lake-effect snow off Lake Huron, Georgian Bay.
Burrows, W.R., *Eastern Snow Conference. Proceedings*, 1991, 48th, p.119-132, 5 refs.
Lake effects, Snowfall, Weather forecasting, Statistical analysis, Great Lakes.

46-1977
Snow accumulation and climate over the Grand Lake Catchment, Newfoundland.
Banfield, C.E., *Eastern Snow Conference. Proceedings*, 1991, 48th, p.133-148, 10 refs.
Snow accumulation, Snow surveys, Climatic factors, Watersheds, Snow water equivalent, Runoff, Canada - Newfoundland.

46-1978
Snow depth estimates for shallow snowpacks from GOES visible imagery.
Donald, J.R., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, p.149-161, 9 refs.
Soulis, E.D., Seglenieks, F., Kouwen, N.
Snow depth, Snow surveys, Snow cover distribution, Spaceborne photography, Remote sensing.

46-1979
Microwave propagation over a changing snowcover.
Peck, L., *Eastern Snow Conference. Proceedings*, 1991, 48th, MP 3003, p.163-174, 4 refs.
Snow cover effect, Snow electrical properties, Microwaves, Snow surface, Radar, Wave propagation.
A bistatic (separate transmit and receive units) microwave (10.5 GHz) radar is in continuous operation over a 120 m range at the CRREL research facility in South Royalton, VT. The transmitting and receiving antennas, mounted at a height of 60 cm over level, grass-covered ground, have E-plane vertical polarization and a 3.5-degree single-lobe pattern. The microwave carrier is modulated at 3 kHz. The microwave field at the receiver consists of directly transmitted, reflected, and scattered radiation. Variation in the received microwave field is monitored as a voltage proportional to field strength (automatic gain control, AGC). The instantaneous AGC voltage is reported to a recording system every half hour, together with automated snow depth and site meteorology data. The AGC is seen to increase during snowfall and to decrease as the depth of the snowcover decreases. During periods of approximately constant snow depth, the AGC fluctuates with the (inferred) moisture content of the snow. For a given snow depth, the microwave field strength at the receiver is weaker, evident as a larger AGC, when the microwaves have propagated over a relatively wetter snow cover. The propagation loss over moist ground, as following snowmelt or thawing of the soil, is lower than that over dry, frozen soil.

46-1980
Modelling the transport and sublimation of blowing snow on the prairies.
Pomeroy, J.W., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, p.175-188, 19 refs.
Gray, D.M., Landine, P.G.
Blowing snow, Wind factors, Snow evaporation, Snow cover distribution, Snow/air interface, Mathematical models, Plains, Wind erosion.

46-1981
Multidimensional observation of snow temperature on windy days.
Albert, M.R., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, MP 3004, p.189-200, 4 refs.
McGilvary, W.R.
Snow air interface, Snow temperature, Wind factors, Air flow, Snow heat flux.
Three-dimensional field measurements of snow temperature in a shallow, seasonal snowpack were made during the winter of 1990-1991. The data show evidence of the thermal effects of windpumping down to depths of approximately 12 cm in a seasonal snow cover of 23 cm total depth. The air movement through the snow tends to decrease the local temperature gradient in the upper portion of the snowpack over the gradient that exists in windless conditions.

46-1982
Ship superstructure icing climatology of coastal eastern North America.
Ryerson, C.C., *Eastern Snow Conference. Proceedings*, 1991, 48th, MP 3005, p.201-211, 21 refs.
Ship icing, Climatic factors, Synoptic meteorology, Ice forecasting, Superstructures, Fronts (meteorology), Statistical analysis.
Superstructure icing occurs when bow-generated spray freezes on decks and bulkheads. Most common to smaller vessels, icing hinders deck activity, increases draft, decreases freeboard, and raises center of gravity. Forecasts of icing potential may allow vessels to avoid hazardous areas. This report develops a synoptic climatology of superstructure icing in eastern North American coastal waters from a database maintained by the Atmospheric Environment Service of Canada. Ships with 5 cm or more of accreted ice were selected from the database, providing a sample of 117 superstructure icing incidents. Eighty percent of cases occurred behind cold fronts, with a mean distance behind cold fronts of 1600 km. Mean distances of cases from the nearest closed low are about 1000 km. Ship headings during icing are typically into the true wind in low to

moderate sea states, with air temperatures averaging -8 C. Synoptic patterns found in this sample of ship icing cases are similar to those of other east coast Northern Hemisphere locations investigated by the Soviets and Japanese

46-1983
Snow as an expedient adsorbent for hazardous waste spills.
Martel, C.J., et al. *Eastern Snow Conference. Proceedings*, 1991, 48th, MP 3006, p.213-220, 7 refs.
Nadeau, B.M.
Snow cover effect, Snow surface, Oil spills, Waste disposal, Adsorption, Oil recovery, Snow permeability, Scavenging.
Laboratory tests indicate that snow can be an effective adsorbent for spills of insoluble hazardous waste materials. Fresh snow was most effective, followed by old snow and wet snow. The sorption ratios ranged from 0.24 g/g to 3.12 g/g depending on the type of snow and waste material. Also, a column study indicated that much of the adsorbed material drains out if it is not collected soon after it is mixed with the snow. A hypothetical spill scenario is presented that shows how snow might be used as an adsorbent in a typical spill situation.

46-1984
High latitude, west coast mountaintop icing.
Claffey, K.J., et al. *Eastern Snow Conference. Proceedings*, 1991, 48th, MP 3007, p.221-232, 9 refs.
Ryerson, C.C.
Icing, Ice storms, Ice detection, Icing rate, Ice accretion, Mountains.
Numerous studies have characterized in-cloud mountaintop icing at North American midlatitude locations. This paper describes mountaintop icing at a high-latitude west coast location, Site Summit, near Anchorage, AK. Icing was monitored at an elevation of 1189 m with a Rosemount ice detector. Data from the 1989-90 winter season at Site Summit are compared to icing conditions at two east coast sites. Site Summit had 102 icing events during the year with an average duration of 7.5 hours per event. Peak icing intensity occurred in the late fall and early winter, with icing rates averaging 0.11 g/hr-cm of ice detector probe length and peaking at 1.06 g/hr-cm of probe length. An overview of weather conditions during icing events is also presented from measurements from nearby rawinsondes.

46-1985
Aeration systems and winter streamflow measurements at Sleepers River, Danville, Vermont.
Denner, J.C., et al. *Eastern Snow Conference. Proceedings*, 1991, 48th, p.233-243, 3 refs.
Shanley, J.B.
Stream flow, Ice control, Bubbling, River basins, Flow measurement, Aeration.

46-1986
Investigation of temperature variation over snow-covered ground.
Hogan, A.W., et al. *Eastern Snow Conference. Proceedings*, 1991, 48th, MP 3008, p.245-254, 17 refs.
Ferrick, M.
Snow air interface, Snow cover effect, Surface temperature, Air temperature, Temperature variations, Temperature inversions.
Fragmentary climatic data show that large mean winter temperature differences occur over short horizontal distances in northern New England. Initial winter experiments indicated that very great local variation in pre-sunrise surface air temperature occurred along the Connecticut Valley. A thin layer of air over or adjacent to the Connecticut River was proposed as a reference plane to examine these temperature differences. Experiments showed this reference plane concept to be valid over a 10 km distance scale, but that nonuniform cloud cover often invalidated the reference plane concept on a 30 km distance scale. The influences of slope and terrain on local temperature structure are presented, showing that temperatures on small flats and in small basins differ the most from general tropospheric temperatures. The greatest local air temperature differences with respect to both time and space occur during periods of warm advection, and somewhat lesser variation occurs during cold zonal advection. The least local temperature differences occur during cold meridional advection.

46-1987
Prediction of snow loading on large snow roofs.
Gamble, S.L., et al. *Eastern Snow Conference. Proceedings*, 1991, 48th, p.255-265, 7 refs.
Kochanski, W.W., Irwin, P.A.
Snow loads, Roofs, Building codes, Computerized simulation.

46-1988
Computer tutorial for Great Lakes ice cover climatology.
Assel, R.A., *Eastern Snow Conference. Proceedings*, 1991, 48th, p.267-272, 3 refs.
Ice conditions, Lake ice, Ice cover, Computerized simulation, Great Lakes.

46-1989
Extinction coefficient measurements in rain and snow using a forward scatter meter.
Hutt, D.L., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, p.273-279, 11 refs.
Oman, J.
Snowfall, Snow optics, Light scattering, Attenuation, Rain, Falling snow

46-1990
High-wind snow collector.
Govoni, J.W., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, MP 3009, p.281-284, 3 refs.
Meese, D.A.
Blowing snow, Snow composition, Meteorological instruments.
Pure snow samples that are free from local contaminants can best be collected on mountaintops, but the extremely high winds that typically occur there make sample collection difficult. During the winters of 1989-90 and 1990-91, snow samples were collected at the summit of Mt. Washington, NH, using a specially designed high-wind snow collector that allowed snow collection in winds as high as 80 mph (129 km/h) and temperatures as low as 0 F (-18 C). The collector consists of a Lexan "bucket" and an adjustable framework that allows the bucket to be rotated directly into the wind for increased collection efficiency.

46-1991
Snow, ice and frozen ground observations in a pond-/marsh wetland.
Melloh, R.A., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, MP 3010, p.285-292, 8 refs.
Racine, C.H.
Wetlands, Frost penetration, Ice cover thickness, Ponds, Snow cover effect, Heat flux, Moisture transfer.

46-1992
Snow infiltration in fresh air intakes: what can be done.
Soligo, M.J., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, p.293-300.
Schuyler, G.D.
Ducts, Blowing snow, Ice control, Air flow, Countermeasures, Snow loads.

46-1993
Precise water temperature measurement at remote field sites.
Clark, C., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, MP 3011, p.301-306, 1 ref.
Daly, S.F., Rand, J.
Water temperature, Temperature measurement, Thermistors, Probes, Data transmission.
An instrument developed at USACRREL to precisely measure water temperature at field sites consists of a temperature probe, connecting cabling and an interface box; it is rugged, highly accurate and easily deployable. The probes contain individually calibrated thermistors, whose resistance is determined by voltage measurements of a half-bridge circuit in the interface box. A precision 10K ohm resistor in the interface box helps assess the accuracy of the voltage measurements, and provides a means of correcting the thermistor readings. Generally, the temperature probe is connected to a Data Collection Platform (DCP) and the readings are transmitted through a Geostationary Operational Environmental Satellite (GOES) to a downlink. Such probes are installed on the St. Clair, the St. Lawrence, the Ohio, the Missouri and the Illinois rivers. They are adaptable to a variety of site conditions, and can be strapped to vertical walls or deployed horizontally through gage well connecting pipes.

46-1994
Arctic snowfences—a big solution for a big problem.
Williams, C.J., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, p.307-313, 3 refs.
Waechter, B.F.
Snowdrifts, Snow fences.

46-1995
Real-time images of airborne snow water equivalent data and satellite areal extent of snow cover data for the U.S. and southern Canada.
Carroll, T.R., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, p.315-316, 1 ref.
Giese, K.L.
Snow cover distribution, Snow surveys, Snow water equivalent, Aerial surveys, Spaceborne photography, Data transmission, Radiometry.

46-1996
Mass balance measurements on Baby Glacier, Axel Heiberg Island, NWT, Canada 1959-present, for the record.
Adams, W.P., et al, *Eastern Snow Conference. Proceedings*, 1991, 48th, p.317-324, 11 refs.
Ecclestone, M.A.
Glacier surveys, Glacier mass balance, Glacier oscillation, Climatic changes, Canada—Northwest Territories—Axel Heiberg Island.

46-1997
Measurement of freeze-up and break-up ice velocities.
Prowse, T.D., et al. *Eastern Snow Conference. Proceedings*, 1991, 48th, p.325-331, 1 ref.
Demuth, M.N.
River ice, River flow, Flow measurement, Velocity measurement, Ice breakup, Measuring instruments

46-1998
Study of ground heat flux and associated changes in snowpack water equivalent and soil moisture.
Maclean, A., *Eastern Snow Conference. Proceedings*, 1991, 48th, p.333-342, 13 refs.
Snow cover effect, Snow water equivalent, Soil water, Soil temperature, Heat flux, Snowmelt.

46-1999
Stability of proteins at subzero temperatures: thermodynamics and some ecological consequences.
Franks, F., et al, *Pure & applied chemistry*, Oct. 1991, 63(10), p.1367-1380, 41 refs.
Hatley, R.H.M.
Cryobiology, Thermodynamics, Cold stress, Cold tolerance, Survival, Low temperature research, Solutions, Ecology, Chemical analysis.

46-2000
Ice crystallization induced by silver iodide and bacteria in microsize droplets dispersed within emulsions.
Clausse, D., et al. *Pure & applied chemistry*, Oct. 1991, 63(10), p.1491-1494, 10 refs.
Drops (liquids), Ice crystal growth, Bacteria, Silver iodide, Dispersions, Heterogeneous nucleation, Cryobiology, Chemical analysis.

46-2001
Some interior observations of southeastern Montana hailstorms.
Musil, D.J., et al, *Journal of applied meteorology*, Dec. 1991, 30(12), p.1596-1612, 48 refs.
Christopher, S.A., Deola, R.A., Smith, P.L.
Storms, Hail clouds, Aerial surveys, Precipitation (meteorology), Wind factors, Reflectivity, Meteorological data, Hailstone growth, Liquid water content.

46-2002
Environmental correlates of arctic ice-edge noise.
Makris, N.C., et al, *Acoustical Society of America. Journal*, Dec. 1991, 90(6), p.3288-3298, 29 refs.
Dyer, I.
Sea ice, Ocean waves, Noise (sound), Ice floes, Ice edge, Stresses, Acoustic measurement, Subglacial observations, Low frequencies, Underwater acoustics.

46-2003
Numerical investigation of energy conversions in geophysical boundary layers.
Andreasson, P., Lulea, Sweden. University of Technology, Dec. 1991, Var. p. (Pertinent: Part I), Ph.D. thesis. Refs. passim. For paper included as Part II:4, see 46-2004.
Fluid flow, Turbulent boundary layer, Heat transfer, Ice water interface, Mathematical models.

46-2004
Calculation of heat transfer in an ice-covered channel flow.
Andreasson, P., et al, Numerical investigation of energy conversions in geophysical boundary layers, Lulea, Sweden, University of Technology, Dec. 1991, 24p., Included as Part II:4. 24 refs.
Svensson, U.
Ice water interface, Heat transfer, River flow, Ice cover effect, Ice heat flux, Turbulent boundary layer, Mathematical models.

46-2005
Study on features of evolution of palaeoclimate in arid and cold region. I. Organic geochemistry method for modelling palaeoclimatic fluctuation.
Huang, Q., et al, *Oceanologia et limnologia sinica*, Nov. 1991, 22(6), p.547-553, In Chinese with English summary. 9 refs.
Meng, Z.Q.
Paleoclimatology, Lacustrine deposits, Bottom sediment, Drill core analysis, Geochemistry.

46-2006
Point snowmelt models with different degrees of complexity— internal processes.
Blöschl, G., et al, *Journal of hydrology*, Dec. 1991, 129(1-4), p.127-147, 27 refs.
Kirnbauer, R.
Snowmelt, Snow hydrology, Runoff forecasting, Snow water content, Simulation, Freeze thaw cycles, Accuracy, Snow temperature.

46-2007
Water balance and soil moisture dynamics of field plots with barley and grass ley.
Johnsson, H., et al, *Journal of hydrology*, Dec. 1991, 129(1-4), p.149-173, 24 refs.
Jansson, P.-E.
Soil water, Agriculture, Water balance, Vegetation factors, Snowmelt, Surface drainage, Evapotranspiration, Mathematical models, Meteorological data.

46-2008
Use of stable isotopes in quantifying groundwater discharge to a partially diverted creek.
Space, M.L., et al, *Journal of hydrology*, Dec. 1991, 129(1-4), p.175-193, 14 refs.
Ingraham, N.L., Hess, J.W.
Ground water, Isotope analysis, Surface drainage, Watersheds, Snowmelt, Snow composition, Stream flow, Flow measurement, Hydrogeochemistry.

46-2009
Identifying ice floes in satellite images.
Banfield, J.D., et al, *Naval research reviews*, 1991, 43(2), p.2-11, 19 refs.
Raftery, A.E.
Sea ice, Ice floes, Spaceborne photography, Detection, Classifications, Image processing, Resolution, Data processing.

46-2010
Growth of wing cracks and the brittle compressive failure of ice.
Schulson, E.M., et al, *Acta metallurgica et materialia*, Nov. 1991, 39(11), p.2651-2655, With French and German summaries. 14 refs.
Kuehn, G.A., Jones, D.A., Fifolt, D.A.
Ice strength, Ice cracks, Crack propagation, Brittleness, Dynamic loads, Sliding, Ice friction, Compressive properties, Photography.

46-2011
Why there's frost on the pumpkin.
Corkern, W.H., et al, *Journal of chemical education*, Oct. 1991, 68(10), p.825.
Holmes, L.H., Jr.
Education, Hoarfrost, Ice formation, Surface temperature, Heat transfer.

46-2012
Handling dry ice in a grade school setting.
Berger, T.G., et al, *Journal of chemical education*, Oct. 1991, 68(10), p.868.
Mellon, E.K., Bare, W.D.
Dry ice (trademark), Experimentation, Safety, Education.

46-2013
Adsorption of water vapor on dihydroxynaphthalene isomers and heat effects of their wetting.
Kharchenko, E.V., et al, *Soviet progress in chemistry*, 1989, 55(6), p.21-24, Translated from Ukrainskii khimicheskii zhurnal. 8 refs.
Skorobogat'ko, E.P., Kolomiets, N.A., Nikeshina, I.V.
Cloud physics, Ice formation, Organic nuclei, Heterogeneous nucleation, Adsorption, Water vapor, Cloud seeding, Chemical analysis, Supercooling.

46-2014
Observational study of a convective internal boundary layer over Lake Michigan.
Chang, S.S., et al, *Journal of the atmospheric sciences*, Oct. 15, 1991, 48(20), p.2265-2279, 56 refs.
Braham, R.R., Jr.
Snowstorms, Lake effects, Precipitation (meteorology), Synoptic meteorology, Boundary layer, Clouds (meteorology), Convection, Aerial surveys, Liquid water content.

46-2015
Density-functional theory of freezing and properties of the ordered phase.
Singh, Y., *Physics reports*, Sep. 1991, 207(6), p.351-444, 337 refs.
Freezing, Theories, Analysis (mathematics), Liquid solid interfaces, Molecular structure, Phase transformations, Liquid phases, Solid phases, Thermodynamics.

46-2016
***Evaluation of the potential for wintertime quantitative* precipitation forecasting over mountainous terrain with an explicit cloud model. Part 1: two-dimensional sensitivity experiments.**
Meyers, M.P., et al, *Journal of applied meteorology*, Jan. 1992, 31(1), p.26-50, 38 refs.
Cotton, W.R.
Clouds (meteorology), Wind (meteorology), Precipitation (meteorology), Weather forecasting, Topographic effects, Simulation, Snow pellets, Meteorological factors, Ice crystal growth, Mountains.

46-2017
Evaluation of a two-dimensional kinematic cloud model using data from a central Sierra Nevada orographic cloud system.
Burrows, D.A., *Journal of applied meteorology*, Jan. 1992, 31(1), p.51-63, 22 refs.
Clouds (meteorology), Precipitation (meteorology), Snowflakes, Snow crystal growth, Simulation, Weather forecasting, Coalescence, Supercooling.

46-2018
Has hail suppression in eastern Yugoslavia led to a reduction in the frequency of hail?.
Mesinger, F., et al, *Journal of applied meteorology*, Jan. 1992, 31(1), p.104-111, 13 refs.
Mesinger, N.
Hail prevention, Performance, Cloud seeding, Silver iodide, Weather modification, Periodic variations, Statistical analysis, Synoptic meteorology.

46-2019
Insights into the cryoprotective mechanism of dimethyl sulfoxide for phospholipid bilayers.
Anchordoguy, T.J., et al, *Cryobiology*, Oct. 1991, 28(5), p.467-473, 22 refs.
Cecchini, C.A., Crowe, J.H., Crowe, L.M.
Cryobiology, Frost protection, Freeze thaw tests, Solutions, Ion exchange, Chemical analysis, Molecular structure.

46-2020
Rate analysis of freeze drying of a model system by a uniformly retreating ice front model.
Kumagai, H., et al, *Agricultural and biological chemistry*, Mar. 1991, 55(3), p.731-736, 11 refs.
Nakamura, K., Yano, T.
Freeze drying, Freezing rate, Simulation, Freezing front, Thermal conductivity, Frozen liquids, Manufacturing, Porous materials.

46-2021
Rate analysis of the freeze drying of liquid foods by a modified uniformly retreating ice front model.
Kumagai, H., et al, *Agricultural and biological chemistry*, Mar. 1991, 55(3), p.737-742, 11 refs.
Nakamura, K., Yano, T.
Freeze drying, Freezing rate, Simulation, Thermal conductivity, Phase transformations, Freezing front, Frozen liquids, Mathematical models, Water content.

46-2022
Multiple processes in the formation of subarctic podzols in Greenland.
Jakobsen, B.H., *Soil science*, Dec. 1991, 152(6), p.414-426, 25 refs.
Soil analysis, Organic soils, Podsol, Soil formation, Subarctic landscapes, Soil profiles, Ion exchange, Soil textures, Greenland.

46-2023
X-ray microanalysis of frozen fluid inclusions.
Ayora, C., et al, *Chemical geology*, Dec. 5, 1990, 89(1-2), p.135-148, 39 refs.
Fontarnau, R.
Frozen liquids, Geochemistry, Cryogenics, Frozen ground chemistry, Microanalysis, Mineralogy, X ray analysis, Chemical composition, Metals.

46-2024
Hydrological characteristics as a determinant of sediment delivery in watersheds.
Matherne, A.M., et al, *International Association of Hydrological Sciences. IAHS publication*, 1988, No.174, Sediment budgets. Proceedings of the Porto Alegre, Brazil, Symposium, Dec. 11-15, 1988. Edited by M.P. Bordas and D.E. Walling, p.89-96, With French summary. 5 refs.
Prestegaard, K.L.
Snowmelt, Sediment transport, Runoff, Suspended sediments, Watersheds, Ground water, Water erosion.

46-2025
Monitoring programme of sediment transport in Norwegian rivers.
Bogen, J., *International Association of Hydrological Sciences. IAHS publication*, 1988, No.174, Sediment budgets. Proceedings of the Porto Alegre, Brazil, Symposium, Dec. 11-15, 1988. Edited by M.P. Bordas and D.E. Walling, p.149-159, With French summary. 7 refs.
Glacial rivers, Sediment transport, Water erosion, Suspended sediments, Meltwater, River basins.

46-2026
Assessing sediment sources in a small drainage basin above the timberline in the Pyrenees.
Diez, J.C., et al, *International Association of Hydrological Sciences. IAHS publication*, 1988, No.174, Sediment budgets. Proceedings of the Porto Alegre, Brazil, Symposium, Dec. 11-15, 1988. Edited by M.P. Bordas and D.E. Walling, p.197-205, With French summary. 10 refs.
Alvera, B., Pugdefàbregas, J., Gallart, F.
Snowmelt, Sediment transport, Runoff, Suspended sediments, Water erosion, Drainage.

46-2027
ETA (Erosion Transport Accumulation) systems, their classification, mapping and management.
Engelen, G.B., et al, *International Association of Hydrological Sciences. IAHS publication*, 1988, No.174, Sediment budgets. Proceedings of the Porto Alegre, Brazil, Symposium, Dec. 11-15, 1988. Edited by M.P. Bordas and D.E. Walling, p.397-412, With French summary. 3 refs.
Venneker, R.G.W.
Sediment transport, Water erosion, Alpine glaciation, Drainage.

46-2028
Comparison of the sediment transport and yield characteristics of two adjacent glacier basins, Val d'Hérens, Switzerland.
Gurnell, A.M., et al, *International Association of Hydrological Sciences. IAHS publication*, 1988, No.174, Sediment budgets. Proceedings of the Porto Alegre, Brazil, Symposium, Dec. 11-15, 1988. Edited by M.P. Bordas and D.E. Walling, p.431-441, With French summary. 8 refs.
Warburton, J., Clark, M.J.
Subglacial drainage, Meltwater, Sediment transport, Suspended sediments, Mountain glaciers, Alpine glaciation, Water erosion.

46-2029
Rapid motion of the 1989 arctic ozone crater as viewed with TOMS data.
Bunn, F.E., et al, *Canadian journal of physics*, Aug.-Sep. 1991, 69(8/9), p.1087-1092, With French summary. 14 refs.
Thirkettle, F.W., Evans, W.F.J.
Ozone, Atmospheric composition, Stratosphere, Remote sensing.
The data from the NIMBUS-7 TOMS instrument were used to study the arctic ozone layer in late winter and spring, 1989. This paper presents an analysis of TOMS total ozone values, to produce a picture of the morphology of the arctic stratospheric ozone crater ..: winter-spring 1989. The arctic crater formed in late January when the vortex moved off the pole to over Scandinavia. The TOMS data clearly show the arctic ozone-crater feature over Scandinavia and the western Soviet Union, on February 2, 1989. It later moved south to Baffin Island and then, in March, down over Toronto, and eventually to western Canada, near Edmonton. A similar unexpected crater was present in the Antarctic fall, on March 15, 1989. This phenomenon is mainly produced by dynamic uplift, but there may be *ozone depletion occurring as well owing to reduced temperatures*. (Auth.)

46-2030
Possible influence of long-term sea surface temperature anomalies in the tropical Pacific on global ozone.
Komhyr, W.D., et al, *Canadian journal of physics*, Aug.-Sep. 1991, 69(8/9), p.1093-1102, With French summary. 47 refs.
Oltmans, S.J., Grass, R.D., Leonard, R.K.
Ozone, Atmospheric composition, Stratosphere, Sea water, Surface temperature.
A significant negative correlation exists between Jun.-Aug. sea surface temperatures (SSTs) in the eastern equatorial Pacific and 15-31 Oct. total ozone values at South Pole, Antarctica. SSTs in the eastern equatorial Pacific were anomalously warmer by 0.67C during 1976-1987 compared with 1962-1975. Quasi-biennial oscillation (QBO) easterly winds in the equatorial Pacific stratosphere were generally stronger after 1975 than they were before that time. Prior to the early-to-mid 1970s the trend in global ozone was generally upward, but then turned downward. During 15-31 Oct. 1988, total ozone at South Pole, which had decreased from about 280 Dobson units (DU) prior to 1980 to 140 DU in 198?, suddenly recovered to 250 DU, though substantial ozone depletion by heterogeneous photochemical processes involving polar stratospheric clouds was still evident in the South Pole ozone vertical profiles. These observations suggest that the downward trend in ozone observed over the globe in recent years may have been at least partially meteorologically induced, possibly through modulation by the warmer tropical Pacific ocean waters of QBO easterly winds at the equator, of planetary waves in the extratropics, of the interaction of QBO winds and planetary waves, and of Hadley Cell circulation. (Auth.mod.)

46-2031
Global ozone trends from a reanalysis of TOMS data.
Canadian journal of physics, Aug.-Sep. 1991, 69(8/9), p.1103-1109, With French summary. 16 refs.
Bunn, F.E., Walker, A.E.
Ozone, Atmospheric composition, Stratosphere, Global change.
Analyses of 10 years of daily average total ozone data for Mar. 15 and Oct. 10 were carried out. These days were chosen as they correspond, respectively, to the maxima in occurrence of the polar ozone thinning phenomena in the northern and southern polar regions. *The NIMBUS-7 TOMS data provide one of the* best data sets available with which to monitor global ozone depletion. Correcting for the TOMS drift in the 1979-1988 Mar. 15 and Oct. 10 data shows that a global ozone depletion is occurring at the rate of 0.224% per year. These analyses show *that the maximum ozone-depletion rate occurs in the polar zone* containing the ozone thinning phenomena. The southern zone depletion rate is some three times greater than the northern (1.06% compared with 0.39% per year), and the rate in the southern zone remains significantly above the global depletion rate, even during absence of the ozone thinning phenomenon (0.47% per year). This decrease is alarmingly greater than predicted by scenario models. (Auth. mod.)

46-2032
Polar ozone depletion: current status.
Canadian journal of physics, Aug.-Sep. 1991, 69(8/9), p.1110-1122, With French summary. 96 refs.
McConnell, J.C., Beagley, S.R., Evans, W.F.J.
Ozone, Atmospheric composition, Stratosphere.
Rapid springtime depletion of column ozone is observed over the Antarctic during the austral spring. A much weaker springtime depletion is observed in the Arctic. This depletion results from a complex chemical mechanism that involves the *catalytic destruction of stratospheric ozone by chlorine in the* colder regions of the polar winter vortices. The magnitude of the spring depletion is much greater in the Antarctic than the Arctic due to the greater stability and longer duration of the southern polar vortex. The magnitude of the antarctic ozone depletion has been increasing since 1979 and its current depletion in October 1990 amounts to 60%. (Auth.mod.)

46-2033
SPEAM-I (sunphotometer Earth atmosphere measurement) observations of high-altitude ozone from STS 41-G.
McElroy, C.T., et al, *Canadian journal of physics*, Aug.-Sep. 1991, 69(8/9), p.1123-1127, With French summary. 11 refs.
Ozone, Atmospheric composition, Stratosphere, Meteorological instruments.
The sunphotometer Earth atmosphere measurement (SPEAM-I) experiment was flown on the United States space shuttle Challenger in Oct. 1984 as part of a group of Canadian experiments referred to as CANEX-I. Measurements of the solar intensity were made through the orbiter side-hatch window at various wavelengths in the visible and near-ultraviolet during a number of terminator crossings, using a hand-held interference filter photometer. Observations at 315 and 324 nm were *analyzed to give vertical profiles of ozone at 63.4S, 91.96E.* These profiles are compared with data from the literature. The success of this experiment points the way to the use of small instruments to make accurate but inexpensive observations of the composition of the upper atmosphere. (Auth.mod.)

46-2034
Tales from ice time.
Monastersky, R., *Science news*, Sep. 14, 1991, 140(11), p.168-172.
Ice cores, Ice sheets, Climatic changes, Ice drills, Greenland.

46-2035
Filchner-Ronne Ice Shelf programme, Report 3 (1986).
Kohnen, H., comp., Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, 113p., Refs. passim. For individual papers see F-45491 through F-45508 and J-45509, or 46-2036 through 46-2054.
DLC G890.F55R47
Research projects, Ice shelves, Glaciology, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Part of the 2nd International Workshop of the Filchner-Ronne Ice Shelf program, held in Cambridge, England, on June 4-5, 1986, was devoted to outlining the progress made in the program since 1985. This volume contains short preliminary reports of recent investigations made as part of the program.

46-2036
Ice rises and ice rumples.
Swithinbank, C., Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.11-14, 3 refs.
DLC G890.F55R47
Ice shelves, Ice surface, Imaging, Ice physics, Rheology, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Ice rises are dome-shaped ice caps grounded on shoals within or at the seaward edge of ice shelves; they are generally ellipsoidal in shape. There are 3 known ice rises on Filchner-Ronne ice shelf: Korff, Henry, and Berkner I. Ice rumples are distinguished by a characteristic crevasse pattern and a rise in the surface. The criterion for distinguishing between ice rumples and an ice rise is the direction of ice movement. Digitally enhanced Landsat images have revealed extensive ice rumples on Filchner Ice Shelf. Some 200 km west of Berkner I., Doake Ice Rumples extend over an irregularly-shaped area with dimensions of about 100 x 30 km.

46-2037
Grounding zone of Rutford Ice Stream, Antarctica.
Doake, C.S.M., *Filchner-Ronne Ice Shelf programme*, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.15-19, 1 ref.
DLC G890.F55R47
Imaging, Spaceborne photography, Grounded ice, Ice surface, Radio echo soundings, Antarctica—Rutford Ice Stream.
A grounding line was first located on Rutford Ice Stream by using tiltmeters. Enhanced Landsat images have since revealed a complex surface morphology for distances up to 100 km downstream which has been interpreted as indicating intermittent grounding. Several radio-echo sounding flights have yielded ice thickness in this area and the echo characteristics help discriminate between areas where the ice is floating and where it is grounded. Features of this part of the ice stream draining from Ellsworth Mountains into Ronne Ice Shelf are described.

46-2038
Flowline on Ronne Ice Shelf.
Jenkins, A., Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.20-27, 4 refs.
DLC G890.F55R47
Ice shelves, Flow measurement, Air temperature, Ice surface, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Sheif.
During the 1985/86 season a study was started on the ice movement on Ronne Ice Shelf along a flowline from Rutford Ice Stream grounding *line to the ice front. A single stake was* placed every 25 km and its position and elevation fixed by a Magnavox MX1502B satellite surveyor. A strain rosette, consisting of a pattern of four stakes, was placed every 50 km. A 10 m temperature was recorded at every site and stake heights *were measured for accumulation studies. To enable a more* accurate determination of accumulation rate a 5 m core was recovered for oxygen isotope analysis. The preliminary results presented here comprise the 10 m temperatures and surface elevations recorded at each site. (Auth. mod.)

46-2039
Glaciological study of the Rutford Ice Stream.
Vaughan, D.G., Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.28-36, 1 ref.
DLC G890.F55R47
Ice surface, Glacier flow, Basal sliding, Mapping, Antarctica—Rutford Ice Stream.
The British Antarctic Survey first conducted glaciological fieldwork on the Rutford Ice Stream in 1978-80 when a triangulation scheme was installed in the grounding zone. During the austral summer of 1984/85 a four-man party returned to the Rutford to establish a new triangulation scheme upstream of the first. The new scheme consists of 173 snow and rock stations, with roughly 3 km separation. There is a central longitudinal line 112 km long, lying approximately along a flowline down the glacier. From this branch 3 transverse schemes, which extend across the ice stream into the regions of high shear rate. The most obvious feature on the transverse profiles, which are presented in figures, is a deep trench running down the western side of the ice stream. Preliminary results of mass flux analysis are presented in a table.

46-2040
Glaciological geodesy on Filchner Ice Shelf 1983-86.
Kock, H., et al, Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.37-42, 4 refs.
Wiegand, A.
DLC G890.F55R47
Rheology, Strain tests, Ice shelves, Velocity measurement, Antarctica—Filchner Ice Shelf, Antarctica—*Ronne Ice Shelf.*
This geodetic contribution to the glaciological investigation of the Filchner Ice Shelf consists of determining the ice shelf motion and strain behavior. Deformation figures were established in a grid and measured in two expeditions, with a number of *redundant observations in order to get high reliability. The ice* motion and strain behavior were determined by comparing the coordinate sets of both surveyings.

46-2041
Satellite image maps: an interpretation aid and planning tool for glaciology.
Sievers, J., et al, Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.43-46.
Grindel, A.
DLC G890.F55R47
Spaceborne photography, Imaging, Data processing, Glaciology, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
The problems of making maps in Antarctica, including the lack of enough ground control, the determination of fixed points and the bridging of vast snow and ice covered areas with no fix point, are discussed. A method with which, in general, it will be possible to overcome some of the problems, and which is based only on digital processing, is outlined.

46-2042
Discharge of ice into the Filchner-Ronne ice shelves.
McIntyre, N., Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.47-52, 14 refs.
DLC G890.F55R47
Drainage, Ice sheets, Mass balance, Velocity measurement, Glacier surveys, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
For the calculation of balance discharges and velocities, the antarctic ice sheet was divided into drainage basins contributing to the discharge of ice through 36 major outlet glaciers and ice streams. Of the 36 drainage basins which together drain 59% of the entire ice sheet, 9 discharge into the Filchner-Ronne ice shelf system. These are listed in a table along with flux and velocity estimates.

46-2043
Ice core studies on the Filchner-Ronne Ice Shelf.
Graf, W., et al, Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.53-57, 2 refs.
DLC G890.F55R47
Ice cores, Snow accumulation, Ice composition, Ice shelves, *Antarctica—Filchner Ice Shelf, Antarctica*—Ronne Ice Shelf.
During the 1983/84 field season on the Filchner-Ronne Ice Shelf, an extended glaciological program was carried out comprising snow pit studies along the Filchner-1-Traverse and ice core drilling at grid point 340, at a distance of 220 km from the ice edge. This paper presents preliminary results of the analysis of the O-18 content of this core, carried out to get information about the structure of the ice shelf.

46-2044
Ice core drilling on Dolleman Island.
Peel, D.A., Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.58-61.
DLC G890.F55R47
Ice cores, Drill core analysis, Drilling, Paleoclimatology, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Drilling activities on Dolleman I. in 1986 formed part of a continuing program to study the past climate of the Antarctic Peninsula. The aim is to reconstruct a palaeoclimatic record which will help to connect similar records from the interior of the ice sheet with those from lower latitudes. Dolleman I., which is situated on the east coast of the peninsula, has a pseudo-continental climatic regime dominated by persistent sea ice in the Weddell Sea and the influence of cold, stable winds draining across the Ronne Ice Shelf from the interior of the continent. *It is expected that climatic records from the site* will relate closely to those from the Ronne and Filchner ice shelves. The site satisfies several important criteria for deeper drilling: it is a symmetrical dome feature with a maximum ice depth of about 460 m. It is expected that a core drilled to be*drock will yield a datable time series through more than 1000* years.

46-2045
George VI Ice Shelf: a temperate ice shelf.
*Paren, J.G., et al, Filchner-Ronne Ice Shelf pro*gramme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.62-63.
Cooper, S.
DLC G890.F55R47
Ice water interface, Ice shelves, Ice thermal properties, Ice salinity, Water temperature, Antarctica—George VI Ice Shelf.
George VI Ice Shelf on the west coast of the Antarctic Peninsula is unusual: unlike other ice shelves which are underlain by sea water barely above freezing, the sea water under the ice shelf is up to 3 deg above freezing. The thermal regime of this ice shelf is being studied, as is the oceanographic circulation beneath it. *It is found that heat from the sea and from the percolation of* meltwater at the upper surface progressively warms the ice shelf. At mid-depth, the coldest level in the ice shelf, the re-

corded temperatures were -6 C off Moore Point, -4 C off Carse Point and, near the northern ice front, between -1 6 C and -1.8 C, depending on the time of year.

46-2046
Glaciological research on the Norwegian Antarctic Research Expedition (NARE) 1984/85.
Orheim, O., Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.64-67.
DLC G890.F55R47
Spaceborne photography, Ice shelves, Mapping, Ice surface, Rheology, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
The NARE glaciological research relevant to the Filchner-Ronne Ice Shelf program included developments in use of Landsat thematic mapper and multispectral scanner images to map surface features and ice flow in Queen Maud Land, and studies of calving and underwater melting of ice fronts in the Weddell Sea area.

46-2047
New aeromagnetic and bedrock elevation data from the area around Haag Nunataks, West Antarctica.
Garrett, S.W., Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.68-71, 2 refs.
DLC G890.F55R47
Bedrock, Topographic surveys, Geophysical surveys, Ice surveys, Antarctica—Haag Nunataks.
During the 1983-84 season of the joint BAS-USAP investigation of the tectonic evolution of West Antarctica, 5000 km of data were retrieved from the area between the Antarctic Peninsula and the Ellsworth Mountains, at the head of Ronne Ice Shelf, including ice thickness information and magnetic measurements. The bedrock topography map confirms that Rutford Ice Stream, Carlson Inlet, and Evans Ice Stream occupy linear depressions with steep escarpments. Between the ice streams are blocks showing elevations between -500 m and 500 m. The dramatic bedrock topography may indicate that much of the rifting associated with the formation of the troughs now occupied by the ice streams occurred during the Cenozoic.

46-2048
Sea bottom topography beneath Ronne Ice Shelf, Antarctica.
Herrod, L.D.B., Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.72-80, 20 refs.
DLC G890.F55R47
Bottom topography, Ocean bottom, Ice shelves, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Bedrock elevation data were collected during oversnow geophysical traverses in summers of 1982-83 and 1983-84, totalling 3,500 km and ranging across the ice shelf from Ronne Ice Front to the Ellsworth Mountains. The new data are combined with data previously collected on bedrock elevations and oversnow ice thickness measurements over the grounded ice areas. The combined data set has been contoured, and a figure revealing, for the first time, details of the bedrock surface beneath the Ronne Ice Shelf is presented. In addition, analysis of the seismic movement at each station has allowed an independent estimate of the total ice thickness over the central area where thin ice was first reported by Robin et al. (1983).

46-2049
Central part of the Filchner-Ronne Ice Shelf.
Thyssen, F., Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.81-83.
DLC G890.F55R47
Ice shelves, Measurement, Ice surveys, Ice cover thickness, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Aerial measurements in 1983/84 showed that the electromagnetic reflection soundings (EMR) did not give the correct ice thickness in the central part of the Filchner-Ronne Ice Shelf. This is indicated in an enclosed figure. In 1985/86 a group of researchers was successful in penetrating the central part of the Filchner-Ronne Ice Shelf by a melt borehole, giving an ice thickness of 465 m in this area. Its location is indicated in another enclosed figure. Thus the ice thickness, as deduced by additional aerial measurements and the borehole results, is near 460 m and not 200 m as deduced from electromagnetic reflections only.

46-2050
Tidal spectrum underneath antarctic ice shelves.
Pedley, M., et al, Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.84.
Paren, J.G., Potter, J.R.
DLC G890.F55R47
Ice shelves, Tides, Ice cover effect, Ice deformation, Antarctica—George VI Ice Shelf.
A year-long tidal record has been obtained from beneath George VI Ice Shelf, an unusual feature of the record is a significant response in tidal species 3 to 7. These harmonics are practically absent from records further north on the west coast of the Antarctic Peninsula, but are present in all tidal height records from George VI Sound. A strong ter-diurnal signal also exists in the tidal currents under the ice shelf. An anelastic component in the deformation of the ice at the grounding line is tentatively proposed as the mechanism responsible.

46-2051
Ice rumples between Korff and Henry ice rises.
Smith, A.M., Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.85-90, 4 refs.
DLC G890.F55R47
Ice shelves, Flow rate, Strains, Ice surface, Bottom topography, Antarctica—Korff Ice Rise, Antarctica—Henry Ice Rise.
The Doake Ice Rumples are a grounded area of ice of approximately 2300 sq km between Korff and Henry ice rises. Unlike ice rises, which generally exhibit independent flow regimes, ice rumples merely reduce ice shelf flow. Ice flow over the Doake Ice Rumples is important to the flow regime of the whole of Ronne Ice Shelf. Together with Korff and Henry ice rises they restrict the flow of much of the ice entering the southern part of the ice shelf to less than half the ice shelf width. To investigate this flow a stake scheme was established over the Doake Ice Rumples in 1983. Ice surface and basal topography over the Doake Ice Rumples are shown.

46-2052
Finite element modelling of the Filchner-Ronne Ice Shelf.
Lange, M.A., et al, Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.91-101, 8 refs.
MacAyeal, D.R.
DLC G890.F55R47
Ice models, Ice shelves, Mapping, Flow rate, Ice water interface, Strains, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Finite element models of the Filchner-Ronne Ice Shelf are presented. The major aim of this study is to evaluate different ice thickness distributions in the light of presently available field data. Radio-echo data of two German expeditions (1983/84 and 1985/86) led to the hypothesis that a previously accepted ice thickness map might be incorrect. In particular, the new data seemed to indicate that the earlier mapped thin ice regions in the central parts of the Ronne Ice Shelf may actually be much thicker. The supposed bottom signals in the thin ice regions are now believed to indicate the interface between regular ice and an as yet undefined (possibly saline) ice layer. The differences between the newly proposed ice thicknesses and earlier estimates are found to be sufficient to alter the dynamic regime of the ice shelf and should be discernible in numerical models.

46-2053
On the flow within the transition zone between ice sheet and ice shelf.
Herterich, K., Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.102-106, 2 refs.
DLC G890.F55R47
Ice shelves, Ice sheets, Ice models, Velocity measurement, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
The flow within the transition zone between ice sheet and ice shelf located around the grounding line has been derived from the force balance and flow in two dimensions. For simplicity, temperature and density were assumed to be homogenous. The main results are: in all cases investigated so far, the transition flow is increasing downstream with large flow gradients around the grounding line; the width of the transition zone is of the order of the ice thickness, with higher values in the case of basal sliding; the vertical and horizontal structure within the transition zone, although of glaciological significance, do not affect the vertically integrated mass balance very much. (Auth.)

46-2054
Oceanographic research during NARE-84/85.
Foldvik, A., Filchner-Ronne Ice Shelf programme, Report 3 (1986), compiled by H. Kohnen, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1986, p.107-109.
DLC G890.F55R47
Ice shelves, Ice water interface, Flow measurement, Ocean currents, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
The physical oceanography work during NARE-1984/85 was a follow-up of previous work in the Weddell Sea. In particular the work was centered on further investigations of the flow of Ice Shelf water out of the Filchner Depression which was discovered during NARE-76/77. One year of currentmeter moorings showed that this flow of supercooled water most probably represents a major contribution to the process of bottom water formation: the volume leaving the shelf break is about 10 times the volume flux of the Amazon River. The temperature is below -1.9 C.

46-2055
Measurement of deformations in buried pipeline.
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Bayly, D.A., Colquhoun, I.R.
Underground pipelines, Settlement (structural), Surveying, Deformation, Design, Structural analysis, Cold weather operation.

46-2056
Constitutive model for ice.
Khoo, H.A., et al, *Journal of engineering mechanics*, Feb. 1992, 118(2), p.259-279, 22 ref.
Hrudey, T.M.
Ice strength, Ice mechanics, Ice models, Viscoelasticity, Ice deformation, Strains, Stress strain diagrams, Mathematical models, Mechanical properties.

46-2057
Microphysical structure and evolution of a central Sierra Nevada orographic cloud system.
Rauber, R.M., *Journal of applied meteorology*, Jan. 1992, 31(1), p.3-24, 48 refs.
Clouds (meteorology), Precipitation (meteorology), Cloud physics, Ice crystal growth, Topographic effects, Wind direction, Aerial surveys, Temperature effects.

46-2058
Prediction of reservoir bank transformation in the region of development of permafrost.
Kagan, A.A., et al, *Hydrotechnical construction*, Oct. 1991, 25(4), p.189-193, Translated from Gidrotechnicheskoe stroitel'stvo, Apr., 1991. 6 refs.
Krivonogova, N.F.
Reservoirs, Frozen ground mechanics, Bank protection (waterways), Permafrost transformation, Forecasting, Cold weather construction, Geocryology, Engineering geology, Electric power.

46-2059
New technique for measuring the dynamic Young's modulus between 295 and 6 K.
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Nyilas, A., Obst, B.
Cryogenics, Temperature effects, Metals, Elastic properties, Strain measuring instruments, Strains, Vibration, Structural analysis.

46-2060
Freezing of supercooled water.
van der Elsken, J., et al, *Journal of molecular structure*, Nov. 18, 1991, 250(2-4), International Symposium on Hydrogen Bond Physics, Barga, Italy, Sep. 11-14, 1990. Proceedings. Edited by A.J. Barnes, et al, p.245-251, 7 refs.
Dings, J., Michielsen, J.C.F.
Water structure, Hydrogen bonds, Freezing, Supercooling, Shear properties, Phase transformations, Thermodynamic properties, Temperature effects.

46-2061
H-bond dynamics in well-characterized supercooled and glassy aqueous solutions.
Dupuy, J., et al, *Journal of molecular structure*, Nov. 18, 1991, 250(2-4), International Symposium on Hydrogen Bond Physics, Barga, Italy, Sep. 11-14, 1990. Proceedings. Edited by A.J. Barnes, et al, p.315-328, 16 refs.
Jal, J.F., Chieux, P., Dianoux, A.J.
Solutions, Relaxation (mechanics), Hydrogen bonds, Water structure, Molecular energy levels, Supercooling, Phase transformations, Temperature effects, Thermodynamic properties.

46-2062
Study of statics and dynamics of hydrogen bonds using neutron scattering.
Sacchetti, F., *Journal of molecular structure*, Nov. 18, 1991, 250(2-4), International Symposium on Hydrogen Bond Physics, Barga, Italy, Sep. 11-14, 1990. Proceedings. Edited by A.J. Barnes, et al, p.329-336, 8 refs.
Hydrogen bonds, Neutron scattering, Ice physics, Molecular structure, Molecular energy levels, Vibration, Ice structure.

46-2063
Some aspects of hydrogen bonding in the phases of water.
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Hydrogen bonds, Water structure, Molecular structure, Solid phases, Phase transformations, Ice physics, Molecular energy levels, Temperature effects.

46-2064
Vibrational density of states of the hydrogen sites in hydrogen-bonded molecular solids.
Andreani, C., et al, *Journal of molecular structure*, Nov. 18, 1991, 250(2-4), International Symposium on Hydrogen Bond Physics, Barga, Italy, Sep. 11-14, 1990. Proceedings. Edited by A.J. Barnes, et al, p.385-393, 13 refs.
Merlo, V., Postorino, P., Ricci, M.A.
Hydrogen bonds, Molecular structure, Molecular energy levels, Ice structure, Neutron scattering, Spectra, Proton transport, Ice relaxation.

46-2065
Model for low frequency Raman scattering in hydrogen-bonded solids.
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Mazzacurati, V., Merlo, V., Ruocco, G.
Hydrogen bonds, Molecular structure, Ice spectroscopy, *Ice structure, Latticed structures*, Light scattering, Spectra, Proton transport.

46-2066
Calorimetric glass transitions in the amorphous forms of water: a comparison.
Mayer, E., *Journal of molecular structure*, Nov. 18, 1991, 250(2-4), International Symposium on Hydrogen Bond Physics, Barga, Italy, Sep. 11-14, 1990. Proceedings. Edited by A.J. Barnes, et al, p.403-411, 36 refs.
Water structure, Phase transformations, Ice structure, *Amorphous ice*, Temperature effects, Ice physics, Temperature measurement, Thermodynamic properties.

46-2067
Ice nucleation in aqueous electrolytes by light scattering observation.
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El Hachadi, A., Dupuy, J.
Solutions, Ice formation, Heterogeneous nucleation, Homogeneous nucleation, Supercooling, Temperature effects, Light scattering, Ice physics.

46-2068
Investigations of the formation process of snow cover in an unirrigated farming zone. [Issledovaniia protsessov formirovaniia snezhnogo pokrova v zone bogarnogo zemledeliia],
Petropavlovskaia, M.S., *Leningrad. Gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.3-21, In Russian. 6 refs.
Snow water content, Snow cover, Water reserves, Snowdrifts, Snow cover distribution.

46-2069
Formation and calculation of snow reserves in agricultural fields with snow fences and evaluating the effectiveness of these measures. [Formirovanie i raschet snegozapasov na sel'skokhoziaĭstvennykh poliakh so snegozaderzhaniem i otsenka effektivnosti etikh meropriiatiĭ],
Kaliuzhnyĭ, I.L., et al, *Leningrad. Gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.22-34, In Russian. 13 refs.
Shutov, V.A., Delarov, D.A.
Snow water content, Snow fences, Analysis (mathematics), Snow cover.

46-2070
Calculating snow evaporation in fields with snow fences. [Raschet ispareniia so snega na poliakh so snegozaderzhaniem],
Shutov, V.A., *Leningrad. Gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.35-45, In Russian. 5 refs.
Snow fences, Snow evaporation, Snow cover, Analysis (mathematics).

46-2071
Analysis of water vapor diffusion (in the example of field investigations in Northern Kazakhstan). [Otsenka diffuzii vodianogo para (na primere polevykh issledovaniĭ v Severnom Kazakhstane)],
Delarov, D.A., et al, *Leningrad. Gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.46-56, In Russian. 11 refs.
Kaliuzhnyĭ, I.L.
Water vapor, Vapor diffusion, Soil water, Snow cover effect, Analysis (mathematics).

46-2072
Effectiveness of snow fences in agricultural fields. [Ob effektivnosti snegozaderzhaniia na sel'skokhoziaĭstvennykh poliakh],
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Dushko, N.B., Kaliuzhnyĭ, I.L.
Snow fences, Soil water, Analysis (mathematics).

46-2073
Calculating the thermal regime of soils in areas with snow fences. [Raschet temperaturnogo rezhima pochv v usloviiakh snegozaderzhaniia],
Lavrov, S.A., *Leningrad. Gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.67-74, In Russian. 3 refs.
Soil temperature, Thermal regime, Cryogenic soils, Analysis (mathematics), Snow fences.

46-2074
Analyzing the effect of snow cover impurities on its melting rate. [Otsenka vliianiia zagriazneniia snezhnogo pokrova na intensivnost' ego taianiia],
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Snow cover, Snow melting, Snow impurities, Analysis (mathematics), Statistical analysis.

46-2075
Method of determining the heat balance components of snow cover in the snowmelt period. [Metodika opredeleniia sostavliaiushchikh teplovogo balansa snezhnogo pokrova v period snegotaianiia],
Shutov, V.A., *Leningrad. Gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.87-96, In Russian. 14 refs.
Snowmelt, Snow cover, Heat balance, Snow air interface, Analysis (mathematics), Statistical analysis.

46-2076
Ways of improving instruments for contact analysis of the physical-mechanical properties of snow. [Puti usovershenstvovaniia priborov dlia kontaktnogo opredeleniia fiziko-mekhanicheskikh svoĭstv snega],
Beĭlinson, M.M., et al, *Leningrad. Gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.97-102, In Russian. 7 refs.
Klimin, A.I., Ovcharenko, V.G., Samoĭlov, R.S.
Indicating instruments, Snow mechanics, Snow physics.

46-2077
Deformation of snow cover under static loads. [Deformatsiia snezhnogo pokrova pri staticheskikh nagruzkakh],
Bolotnikov, G.I., *Leningrad. Gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.103-106, In Russian. 2 refs.
Snow deformation, Snow cover, Static loads.

46-2078
Analyzing the effect of a shock wave on snow cover. [Otsenka vozdeĭstviia udarnoĭ volny na snezhnyĭ pokrov],
Delarov, D.A., et al, *Leningrad. Gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.107-122, In Russian. 2 refs.
Kaliuzhnyĭ, I.L.
Snow cover, Snow mechanics, Snow strength, Snow density, Shock waves, Snow water content, Analysis (mathematics).

46-2079
Correlation between the turbulence coefficients in vertical heat flux and moisture in the surface layer of air. [O sootnoshenii koeffitsientov turbulentnosti v vertikal'nykh potokakh tepla i vlagi prizemnogo sloia vozdukha],
Postnikov, A.N., *Leningrad. Gidrologicheskiĭ institut. Trudy*, 1991, Vol.346, p.123-125, In Russian. 1 ref.
Heat flux, Turbulence, Analysis (mathematics), Turbulent flow, Snow cover effect, Water vapor.

46-2080
Geologic record of glaciation: relevance to the climatic history of earth.
Young, G.M., *Geoscience Canada*, Sep. 1991, 18(3), p.100-108, 89 refs.
Climatic changes, Glacial geology, Paleoclimatology, Geochronology.
The geologic record suggests that the surface of the planet has had a remarkably stable thermal history. This stability is remarkable because of an inferred 30% increase in solar luminosity since Early Archean time. The glacial record provides some of the best evidence of thermal perturbation. The major cause of glaciation may be the periodic reduction of atmospheric CO2, which is linked, *via* plate tectonics, to the weathering cycle. Early Proterozoic glaciation may have occurred because of the combination of enhanced weathering of new cratons, and the faint early sun. Associated highly weathered rocks may reflect the high CO2 content of the atmosphere. Late Proterozoic glaciation is explained as being due to lowering of atmospheric CO2 levels by extreme weathering of a supercontinent at low latitudes. Most Phanerozoic glaciation was caused by the combined effects of weathering of an elevated supercontinent (Pangea) and polar positioning. The Cenozoic glaciation may be related to high latitudes of some continental masses and reduced CO2 levels due to enhanced weathering of the continents, which become emergent as the Atlantic Ocean floor ages, cools and sinks. In the short term, the "Little Ice Age" climatic cycle suggests warming for about the next 1,000 years. Global cooling should follow as the Earth descends into the next severe glaciation predicted by Milankovitch theory. Anthropogenic contribution to the greenhouse effect should enhance the short-term warming trend. The repeated cycle of Cenozoic glaciations will end with the initiation of subduction along the Atlantic margins. (Auth. mod.)

46-2081
Geological perspective on climatic change: computer simulation of ancient climates.
Fawcett, P.J., et al, *Geoscience Canada*, Sep. 1991, 18(3), p.111-117, 25 refs.
Barron, E.J.
Climatic changes, Paleoclimatology, Models.
Global climate models are used to make predictions for possible future climatic changes, but their ability to simulate climatic states other than the present day is not well constrained. The sedimentary record contains a wealth of information on past global climatic change. From this one can get a good idea of what past climatic extremes were, and some idea of their underlying causes. By simulating the climate of a past time, one can evaluate the ability of a climate model to represent a climatic state substantially different from the present day. At present, models are not well utilized to reproduce a global climatology for a particular time period. Rather, the models are used for sensitivity experiments. One geologic factor is varied (e.g., geography or CO2 level) while all others are held constant. In this way, the effect on the climate of changing that one factor can be tested, and insights into the mechanisms of global change are gained. The results are then compared with the geologic record. Two case studies are given as examples. They range through both polar regions during the Cretaceous and Late Pleistocene, showing the march of temperature from a global perspective; they serve as guides for assessing the nature of fu[illegible] global conditions. (Auth. mod.)

46-2082
Minimization and recycling of drilling waste on the *Alaskan North Slope.*
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Malachosky, E., Lantero, D.M., Hampton, P.D.
Oil wells, Drilling, Waste disposal, Environmental impact, Cold weather operation, Chemical analysis, Petroleum industry, United States—Alaska—Prudhoe Bay.

46-2083
Viscous-inviscid interaction due to the freezing of a liquid flowing on a flate plate.
Higuera, F.J., *Physics of fluids A*, Dec. 1991, 3(12), p.2875-2886, 25 refs.
Laminar flow, Liquid cooling, Liquid solid interfaces, Solidification, Heat flux, Boundary layer, Plates, Analysis (mathematics), Viscous flow.

46-2084
Assessing the strengths and limitations of low-temperature curings.
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Kaminski, W.W., Gaschke, M., Bloodgood, D.T.
Protective coatings, Cold weather performance, Resins.

46-2085
Canadian experience: cold weather curing coatings.
Witter, J., *Journal of protective coatings & linings*, Nov. 1991, 8(11), p.34-39.
Protective coatings, Steel structures, Cold weather performance, Chemical composition.

46-2086
Other options and concerns for coating under cold weather conditions.
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Protective coatings, Cold weather performance, Classifications.

46-2087
Regional hydrologic and carbon balance responses of forests resulting from potential climate change.
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Nemani, R.R.
Climatic changes, Growth, Biomass, Trees (plants), Forest ecosystems, Water balance, Snowmelt, Photosynthesis, Simulation, Global warming.

46-2088
Application of physical adsorption thermodynamics to heterogeneous chemistry of polar stratospheric clouds.
Elliott, S., et al, *Journal of atmospheric chemistry*, Oct. 1991, 13(3), p.211-224, 45 refs.
Turco, R.P., Toon, O.B., Hamill, P.
Polar atmospheres, Cloud physics, Atmospheric composition, Ice vapor interface, Adsorption, Chemical analysis, Chemical properties, Thermodynamics, Atmospheric density.

46-2089
Repair and maintenance of refrigerated warehouse floors.
Schafran, B.F., et al, *Journal of protective coatings & linings*, Mar. 1991, 8(3), p.60-64, 9 refs.
Armstrong, C.W.
Floors, Industrial buildings, Refrigeration, Maintenance, Protective coatings, Concrete slabs, Temperature effects.

46-2090
Imaging atom-probe analysis of a vitreous ice interface.
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Stintz, A.
Vitreous ice, Imaging, Probes, Ice spectroscopy, Ice solid interface, Layers, Spectra, Metals, Surface properties.

46-2091
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England, A.W.
Soil classification, Terrain identification, Radiometry, Remote sensing, Frozen ground, Brightness, Thawing, Correlation, Soil water, Surface properties.

46-2092
Comparison of algorithms for retrieval of snow water equivalent from Nimbus-7 SMMR data in Finland.
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Radiometry, Remote sensing, Snow cover structure, Snow water equivalent, Brightness, Statistical analysis, Accuracy, Surface properties.

46-2093
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Mitsumoto, M., Sengoku, M., Abe, T.
Radar echoes, Avalanches, Snow cover structure, Subsurface investigations, Accidents, Detection, Human factors, Simulation, Sensor mapping.

46-2094
Canadian East Coast radar trials and the K-distribution.
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Sea ice, Icebergs, Radar echoes, Scattering, Ice detection, Resolution, Polarization (waves), Statistical analysis, Remote sensing.

46-2095
Structural studies of water and other hydrogen-bonded liquids by neutron diffraction.
Dore, J.C., *Journal of molecular structure*, Nov. 18,1991, 250(2-4), International Symposium on Hydrogen Bond Physics, Barga, Italy, Sep. 11-14, 1990. Proceedings. Edited by A.J. Barnes, et al, p.193-211, 54 refs.
Hydrogen bonds, Liquids, Amorphous ice, Neutron diffraction, Molecular structure, Supercooling, Water structure, Liquid phases, Temperature effects.

46-2096
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DLC GB400.2.I58 1985
Geomorphology, Glacial geology, Glacial erosion, Glacial deposits, Paleoclimatology, Periglacial processes, Moraines.

46-2097
Characteristics of a high-latitude fluvial environment: the river Oulankajoki, NE Finland.
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Rivers, Ground water, Snowmelt, Ground thawing, Frost penetration, Ground ice, Flooding, Finland—Oulankajoki River.

46-2098
Bank erosion and frost action: an example from South Wales.
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Frost action, Erosion, Banks (waterways), Ice needles, Ice models, Mathematical models, United Kingdom—Wales.

46-2099
Changing fluvial processes in a small lowland valley at the end of the Weichselian Pleniglacial and during the Late Glacial.
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46-2100
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Suspended sediments, Correlation, River basins, Snowmelt, Snow hydrology, Channels (waterways).

46-2101
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Geomorphology, Isostasy, Glacial geology, Sediments, Landforms, Plates, Avalanche erosion, Glacial erosion, New Zealand—Alps.

46-2102
Gully evolution in response to both snowmelt and flash flood erosion, Wn. Colorado.
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Gullies, Snow erosion, Water erosion, Flooding, Snowmelt, Hydrology, Snow water equivalent, Models.

46-2103
Approach to the identification of morphoclimates.
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Statistical analysis, Rain, Freeze thaw cycles, Frost weathering, Wind velocity, Climatology.

46-2104
Geomorphology of the Hengduan Mountains, China.
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Zhong, X.H.
Geomorphology, Glacial geology, Mountains, Terraces, Cirque glaciers, Pleistocene, China—Hengduan Mountains.

46-2105
Periglacial landforms in the northern part of the Greater Xingan Ranges, China.
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Periglacial processes, Landforms, China—Greater Khingan Range.

46-2106
Palsas and mineral permafrost mounds in northern Québec.
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Seguin, M.K., Lévesque, R.
Landforms, Periglacial processes, Discontinuous permafrost, Geomorphology.

46-2107
Use of strain gauges for experimental frost weathering studies.
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McGreevy, J.P., Whalley, W.B.
Frost weathering, Strain measuring instruments, Thermal stresses, Freeze thaw cycles, Cracks.

46-2108
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Glacier beds, Landforms, Glacial erosion, Glacial geology.

46-2109
Surge moraines.
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Moraines, Hummocks, Glacier surges.

46-2110
Facies analysis and depositional models of Vistulian ice-marginal features in northwestern Poland.
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Geomorphology, Glacial geology, Glacial deposits, Ice cover, Ice models, Poland.

46-2111
De Geer moraines in Finland.
Zilliacus, H., International geomorphology 1986. International Conference on Geomorphology, 1st, University of Manchester, UK, Sep. 15-21, 1985. Proceedings, vol.2. Edited by V. Gardiner, Chichester, UK, John Wiley & Sons, 1985, p.711-724, Refs. p.721-724.
Moraines, Geomorphology, Glacial deposits, Finland.

46-2112
Review of controversial issues related to the Late Palaeozoic glaciation of southern South Australia.
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Glaciation, Glacial geology, Terrain identification, Landforms, Glacial deposits, Australia.

46-2113
Glaciers of the southern Lyngen Peninsula, Norway.
Gordon, J.E., et al, International geomorphology 1986. International Conference on Geomorphology, 1st, University of Manchester, UK, Sep. 15-21, 1985. Proceedings, vol.2. Edited by V. Gardiner, Chichester, UK, John Wiley & Sons, 1985, p.743-758, 13 refs.
Whalley, W.B., Gellatly, A.F., Ferguson, R.I.
Glacier surveys, Glacier mass balance, Glacier ablation, Norway—Lyngen.

46-2114
Palaeo-environment of the last glacial (Dali) stage in North China.
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Li, X.G.
Paleoclimatology, Vegetation, Trees (plants), Plants (botany), Glaciation, Permafrost, Pollen, China.

46-2115
Establishment of soil cover on tills of variable texture and implications for interpreting paleosols—a discussion.
Gellatly, A.F., International geomorphology 1986. International Conference on Geomorphology, 1st, University of Manchester, UK, Sep. 15-21, 1985. Proceedings, vol.2. Edited by V. Gardiner, Chichester, UK, John Wiley & Sons, 1985, p.775-784, 22 refs.
Soil texture, Loess, Soil formation, Moraines, Soil dating, Glacial deposits, Glacial geology.

46-2116
Quaternary problems in the German alpine foreland.
Kogner, K., International geomorphology 1986. International Conference on Geomorphology, 1st, University of Manchester, UK, Sep. 15-21, 1985. Proceedings, vol.2. Edited by V. Gardiner, Chichester, UK, John Wiley & Sons, 1985, p.785-795, 19 refs.
Pleistocene, Alpine glaciation, Paleoclimatology, Quaternary deposits, Terraces.

46-2117
Re-examination of the Dimlington Stadial glacigenic sequence in Holderness.
Foster, C.T., International geomorphology 1986. International Conference on Geomorphology, 1st, University of Manchester, UK, Sep. 15-21, 1985. Proceedings, vol.2. Edited by V. Gardiner, Chichester, UK, John Wiley & Sons, 1985, p.829-842, 33 refs.
Glacial deposits, Lithology, Subglacial observations, Boreholes, Models, Glacial geology, United Kingdom.

46-2118
Glacial geomorphology, Quaternary glacial sequence and palaeoclimatic inferences in the Ecuadorian Andes.
Clapperton, C.M., International geomorphology 1986. International Conference on Geomorphology, 1st, University of Manchester, UK, Sep. 15-21, 1985. Proceedings, vol.2. Edited by V. Gardiner, Chichester, UK, John Wiley & Sons, 1985, p.843-870, 44 refs.
Geomorphology, Glacial geology, Quaternary deposits, Paleoclimatology, Glacial erosion, Moraines, Glaciers, Landforms, Ecuador—Andes.

46-2119
Inventory of caves in the county of Västernorrland, N. Sweden.
Sjöberg, R, International geomorphology 1986. International Conference on Geomorphology, 1st, University of Manchester, UK, Sep. 15-21, 1985. Proceedings, vol.2. Edited by V. Gardiner, Chichester, UK, John Wiley & Sons, 1985, p.1191-1198, 7 refs.
Ice caves, Caves, Geomorphology, Sweden.

46-2120
Filchner-Ronne Ice Shelf programme, Report 4 (1990).
Miller, H., ed, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, 135p., Refs. passim. For individual papers see 46-2121 through 46- 2142 or F-45515 through F-45536.
DLC G890.F55R47
Research projects, Ice shelves, Glaciology, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
This volume contains summaries of papers presented at the 3rd, 4th and 5th International Workshop of the Filchner-Ronne Ice Shelf program held in Oslo on June 13-14, 1988; in Bremerhaven on June 22-23, 1989; and in Cambridge on June 27-28, 1990, respectively. The papers include preliminary results of recent investigations made as part of the program, and plans for future work.

46-2121
Glaciological fieldwork on Ronne Ice Shelf, 1985-88: some preliminary results.
Jenkins, A., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.7-11, 5 refs.
DLC G890.F55R47
Ice shelves, Velocity measurement, Strains, Ice surface, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
During the 1985/86 and 1986/87 field seasons a widely spaced stake scheme was established along a flowline on Ronne Ice Shelf extending from the Rutford Ice Stream grounding line to the ice front. The scheme was revisited and resurveyed during the 1987/88 season. The complete data set comprises 28 sites with known velocity, ice thickness, surface elevation, surface temperature and accumulation rate. In addition, at 17 of the sites strain rates and rotation rates are also known.

46-2122
Recent investigations of surface undulations where Rutford Ice Stream enters Ronne Ice Shelf.
Jenkins, A., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.12-17, 3 refs.
DLC G890.F55R47
Topographic surveys, Ice surface, Spaceborne photography, Mapping, Antarctica—Rutford Ice Stream, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Downstream of the grounding line on Rutford Ice Stream a distinctive pattern of surface undulations extends more than 150 km into the ice shelf. The troughs are up to 30 m deep and correspond to areas of thinner ice which are characterized by complex basal radar reflections. This and the fact that surface elevations in these depressions are above those required for hydrostatic equilibrium, initially led to the conclusion that these areas were grounded. However, comparison of a 1986 SPOT image of the area with a 1974 Landsat image revealed that the topographic features are moving with the ice shelf. Detailed studies of some of the most prominent features were undertaken during the 1987/88 field season. These included the measurement of surface elevation and ice thickness along a number of profiles which were accurately fixed by Magnavox.

46-2123
Ice velocity, flow line, and deformation determination from GPS and Transit at Filchner Ronne Ice Shelf.
Hinze, H., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.18-31, 12 refs.
DLC G890.F55R47
Velocity measurement, Ice deformation, Ice shelves, Spaceborne photography, Data processing, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Two satellite systems, the Transit or Navy Navigation Satellite System (NNSS) and the Global Positioning System— Navigation System with Time and Ranging (NAVSTAR/GPS), are compared in terms of satellite positioning and working features. It is suggested that the GPS allows a faster, more precise and continuous position determination than the Transit—NNSS. To achieve similar position accuracy for absolute coordinates as well as for relative, the two systems require an observation span of 1/2 to 1 day with NNSS and 1/2 to 1 hour with GPS. It is pointed out that the GPS satellite configuration, as it is today, is limited in such a manner that only during special hours, depending on the geographic location of the user, is satellite positioning possible during a window of radio visibility.

46-2124
520 year temperature record of a 100 m core from the Ronne Ice Shelf, Antarctica (extended abstract).
Graf, W., et al, Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.41-45, 4 refs.
Reinwarth, O., Moser, H.
DLC G890.F55R47
Temperature variations, Ice shelves, Ice cores, Paleoclimatology, Ice composition, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Indications for climatic changes during the last 520 years were inferred from the O-18 contents of a 100 m ice core from the Ronne Ice Shelf. The core was drilled during the 1983/84 season by a German antarctic field party at point 340 (55.4E, 78.6S) and dated using the seasonal variations of the O-18 contents. It spans a time of 520 years and dates back to 1461 A.D. The O-18 time series, derived from the O-18 profile, reflects first of all the decrease of O-18 content in the catchment area of the core extending from the drilling site 250 km to the south and shows secondly, a large scatter from year to year. For a climatological interpretation, the O-18 series has to be corrected for continental effects on the delta O-18 values.

46-2125
Isotopic and stratigraphical interpretation of a 16 m firn core nearby Druzhnaya I (extended abstract).
Graf, W., et al, Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.46-49, 4 refs.
Reinwarth, O., Oerter, H., Diurgerov, M.
DLC G890.F55R47
Snow composition, Firn stratification, Isotope analysis, Snow accumulation, Ice temperature, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
During Feb. 1986, approximately 2.5 km south of the Soviet summer station Druzhnaya I, the wall of a 5 m deep snowpit was sampled at intervals of 5 cm, and from the bottom of the snowpit a firn core was drilled to 16 m depth. For analysis, the core was later subsampled in 2.4 cm intervals in the laboratory. Stratigraphical features (grain size, wind and ice crusts, density) and the temperature of the firn were determined. The density increases from 0.400 at 1 m depth to 0.600 g/cu cm at 16 m depth. The temperature profile reveals temperatures decreasing from -11.0 C to -24.5 C and a 10 m temperature of -24.0 C. The ratio of the stable isotopes of hydrogen and oxygen, the H-3 content and the electrolytical conductivity of the melted samples were determined. The analytical results together with the calculated deuterium excess are shown. The mean accumulation rate for the period 1952- 1985 was calculated to be 24 cm WE, with a relative large standard deviation of 6 cm WE. The accumulation rates show a decrease, significant on a 95% confidence level, from 1952 to 1985 with 0.23 cm WE per year.

46-2126
Preliminary results of British Antarctic Survey fieldwork on Ronne Ice Shelf 1988/89.
Vaughan, D.G., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.50-51, 3 refs.
DLC G890.F55R47
Velocity measurement, Strain tests, Ice models, Ice shelves, Rheology, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
To provide realistic input values for medium scale modelling, or valuable testing data for larger scale modelling of the Ronne Ice Shelf, it was proposed to establish 12 strain rosettes in the region. Logistical limitations dictated that this figure be reduced to 6. The most important 6 sites were visited during the 1988/89 season, and strain rosettes and [illegible] installed at each. It is hoped that the survey markers used will remain visible for at least two years and that at least one revisit will be possible. Remeasurement of the exposed lengths of the survey markers will provide a measurement of the local accumulation at each site, another important parameter in the input required for modelling.

46-2127
Ice—ocean interaction on Ronne Ice Shelf, Antarctica.
Jenkins, A., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.52-54, 3 refs.
DLC G890.F55R47
Ice shelves, Bottom topography, Ice melting, Ice water interface, Water temperature, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Detailed glaciological measurements have been made at 28 sites lying on an approximate flowline extending 760 km across Ronne Ice Shelf from the grounding line of Rutford Ice Stream. Doppler satellite surveying has enabled ice velocities and surface elevations to be calculated at each site, and at 17 of them ice deformation rates have been derived from repeated measurements of local stake networks. Calculations indicate basal melting in excess of 1 m/a over the first 100 km of the flowline downstream of Rutford Ice Stream. Melting continues at a lesser rate over the next 200 km before freezing commences. Freezing then dominates up to the final 100 km before the ice front, resulting in the accumulation of a layer of saline ice up to 40 m thick. This is rapidly removed as melt rates increase to over 6 m/a at the ice front. Profiles of ice shelf thickness and sea-bed topography are illustrated.

46-2128
Glacial geodetic investigations on Filchner-Ronne Ice Shelf 1989/90.
Möller, D., et al, Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.55-59.
Ritter, B.
DLC G890.F55R47
Ice shelves, Ice melting, Geodetic surveys, Topographic maps, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
The data required for the modelling of melting rates of the ice near a projected borehole at 77S-52.5W are outlined. As heights above sea level are available only at a very few points near the ice front, and cannot be derived by satellite positioning, two height profiles along flowlines are projected and shown in a figure.

46-2129
ERS-1 altimeter activities in Antarctica.
Bamber, J., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.60-61, 2 refs.
DLC G890.F55R47
Ice shelves, Topographic maps, Spaceborne photography, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
A brief resume is given of previous ice sheet altimetric studies undertaken by the Mullard Space Science Laboratory (MSSL) over the Larsen ice shelf, using Seasat data to indicate the potential of the instrument. Some details of the ERS-1 mission are given, including orbit scenarios, instrument and product details. The altimeter ice sheet validation requirements are discussed. (Auth.)

46-2130
Unmanned submersibles: the development of AUTOSUB within NERC, UK.
Paren, J.G., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.62-65.
DLC G890.F55R47
Ice shelves, Research projects, Subglacial navigation, Oceanographic surveys, Instruments, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
In 1987 a five year program was approved by the UK Natural Environment Research Council (NERC) to develop an unmanned autonomous submersible craft (AUTOSUB) for oceanographic research. AUTOSUB would be required to do new work, impossible using conventional techniques, providing opportunities for the Filchner- Ronne Ice Shelf program. Specifications for an under-ice AUTOSUB have been sketched out with the Scott Polar Research Institute and the British Antarctic Survey; the specification agreed upon is outlined.

46-2131
Contemporary and Cenozoic glaciomarine processes of Antarctica: the Filchner-Ronne Ice Shelf.
Hambrey, M.J., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.66-67.
DLC G890.F55R47
Research projects, Ice shelves, Glacial deposits, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
The sedimentological aspects of ice shelf studies, the geological importance of glaciomarine sediments and ice shelf work required to address sedimentological problems are briefly reviewed. A proposal currently under review by the UK Natural Environment Research Council is outlined, involving collaboration between German and British marine geologists, geophysicists, and glaciologists, with the aim to investigate by means of shallow coring and geophysical surveying the area off the Ronne Ice Shelf.

46-2132
Glaciological data.
Graf, W., et al, Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.68-72, 8 refs.
Wagenbach, D.
DLC G890.F55R47
Snow accumulation, Snow composition, Snow density, Firn, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Compilation of data on snow- and firn densities, accumulation rates and snow chemistry from the Filchner-Ronne Ice Shelf, Ekström Ice Shelf and Ritscher Upland is reported. Results are presented in tables and in figures. The data are based on snowpit samples, shallow firn cores (typically drilled to 10 m depth) and ice cores (drilled to depths greater than 20 m). The densities of the snowpit samples were determined by density probes 6 cm in diameter, that of the cores by weighting core samples up to 80 cm in length. The snow and firn were dated using the seasonal variation of stable isotope ratio (H-2/H-1 and O-18/O-16).

46-2133
Glaciological data: geodetic measurements.
Hinze, H., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.73.
DLC G890.F55R47
Ice shelves, Velocity measurement, Gravity, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
A list of publications is given of studies on the Filchner- Ronne Ice Shelf velocities and strains, surface elevation and geoidal models.

46-2134
Glaciological satellite image map series Filchner-Ronne- Schelfeis 1:2,000,000.
Sievers, J., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.84-85.
DLC G890.F55R47
Research projects, Spaceborne photography, Mapping, Ice shelves, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
The concept of a cooperative cross-disciplinary project has been developed to publish a series of thematic satellite image and line maps of Filchner-Ronne Ice Shelf at 1:2 million scale. The participating disciplines and collaborators are listed.

46-2135
Two thematic satellite image maps of Filchnerschelfeis at 1:250,000 scale.
Sievers, J., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.86-87.
DLC G890.F55R47
Spaceborne photography, Mapping, Ice shelves, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
In continuation of a research program for antarctic thematic mapping conducted at the Institut für Angewandte Geodäsie, two satellite image maps have been published. They are the experimental result of preserving the image character of the satellite imagery in the maps and of enhancing the thematic glaciological information content by graphical elements.

46-2136
***Digital Antarctic Coastline: a project of* topographic-glaciological interpretation and digitisation of the coastal region of Weddell Sea.**
Heidrich, B., et al, Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.88-90.
Sievers, J., Thiel, M., Schenke, H.W.
DLC G890.F55R47
Ice shelves, Mapping, Spaceborne photography, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
An outline is presented of a project of topographic interpretation and digitization of the coastal region of western New Schwabenland, Coats Land and Filchner-Ronne Ice Shelf; the outlined area is shown in a sketch. Some 80 Landsat-MSS scenes are being used to interpret the imagery. The interpretation is based on an object catalogue comprising topographic-glaciological features listed in this report.

46-2137
MSSL Science Plan: calibration and validation of satellite remote sensing data over polar regions.
Bamber, J.L., et al, Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.91-97, 6 refs.
Ridley, J.K., Mantripp, D.R.
DLC G890.F55R47
Mapping, Data processing, Snow surface, Remote sensing, Models, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
MSSL's aim is to provide an improved understanding of the microwave (and infrared) behavior of snow so that remote sensing data over snow-covered surfaces can be exploited with maximum benefit. In the pursuit of this objective, it is planned to undertake comprehensive measurements of relevant surface and sub- surface parameters characterizing the microwave response. These data will be used as inputs for modelling the dielectric and scattering behavior of snow. Results of this procedure will be compared with data from ERS-1 and other remote sensing satellites, and used to provide a more complete description of the spatial and temporal variation of surface snow conditions. They will also improve the accuracy of existing measurement techniques such as elevation and mass balance estimates from altimeter data. It is intended that this work will be of considerable benefit to the Filchner-Ronne Ice Shelf program. A topographic map of the ice shelves will be produced with anticipated elevation accuracy of better than 1 m. (Auth. mod.)

46-2138
Glaciological work at Filchner-Ronne ice shelves during the 1989/1990 field season.
Oerter, H., et al, Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.98-103, 3 refs.
DLC G890.F55R47
Ice shelves, Ice cores, Drill core analysis, Electrical resistivity, Ice composition, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
From Jan. 4 through Feb. 18, 1990, a ground program was carried out on the Filchner-Ronne ice shelves, including ice core drilling and hot water drilling at the drill camp site, as well as geodetic measurements, radio echo soundings, snow-pits and 10 m cores along a traverse route. In this report, a summary is given of the activities concerned with ice core drilling and glaciological field work. The radio echo sounding program and hot water drilling program are described separately in this volume.

46-2139
Structures and dielectric properties of meteoric and marine ice in the central part of the Filchner-Ronne Ice Shelf.
Blindow, N., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.104-108, 1 ref.
DLC G890.F55R47
Ice shelves, Ice structure, Dielectric properties, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Ground based electromagnetic reflection (EMR) measurements using a 40 MHz monopulse sounder with high resolution were carried out in the central part of the Filchner-Ronne Ice Shelf (FRIS) during an oversnow traverse of the German FRIS Expedition, 1989/90. In this area, a basal layer of marine ice with thickness up to 400 m was revealed by aerogeophysical measurements. Between the western and eastern part, the meteoric ice has a minimum thickness of less than 100 m, and the interface meteoric/marine exhibits a complicated and irregular structure on both sides of this minimum.

46-2140
Temperature profiles and investigation of the ice-shelf/ocean boundary using hot water drilled holes: report of field work on FRIS 1989/90.
Grosfeld, K., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.109-111, 1 ref.
DLC G890.F55R47
Ice shelves, Thermal drills, Subglacial observations, Temperature gradients, Ice water interface, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
During the German FRIS field season of 1989-1990, several hot water drill-holes were made in the Filchner-Ronne Ice Shelf with intent to investigate the temperature-depth profile and the bottom melting rate. The drilling equipment and method used are described. Using the hot water drilling technique, access was gained to the sea underneath the ice shelf; initial measurements were taken. It is expected that re-measurements in two or three years will yield a reliable melting rate to an accuracy of 0.2 m.

46-2141
One-dimensional model of ice shelf-ocean interaction.
Jenkins, A., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.112-119, 18 refs.
DLC G890.F55R47
Ice shelves, Ice models, Ice water interface, Ice melting, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Results from a one-dimensional model of ice shelf-ocean interaction have been presented, which show good agreement with previous observations made on Ronne Ice Shelf. These results illustrate the role played by the ice shelf basal gradient in controlling the flow of Ice Shelf Water and hence in modifying the distribution and rate of basal accumulation and ablation. There are potential instabilities in the system: increased melting near the grounding line of an ice shelf will increase the basal gradient, which will lead to a further increase in basal melting in a positive feedback loop. Such effects can only be investigated with the help of a model describing the complete ice shelf-ocean system. Coupling of this one-dimensional oceanographic model to an ice shelf flowline model seems to be a realizable goal.

46-2142
Glaciologic and oceanographic studies on Fimbulisen during NARE 1989/90.
Orheim, O., Filchner-Ronne Ice Shelf programme, Report 4 (1990), edited by H. Miller, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1990, p.120-131, 8 refs.
DLC G890.F55R47
Ice shelves, Subglacial observations, Boreholes, Ice water interface, Antarctica—Fimbul Ice Shelf.
The objective of this program was to investigate the processes taking place underneath an ice shelf. Fimbul Ice Shelf, which is 130 km wide, was selected because it has a size similar to many of the ice shelves around Antarctica. The main effort was to drill through the inner part of the Fimbul Ice Shelf, conduct under-ice sampling, and deploy sub-ice instrumentation. Installing the instruments required a hole with a 0.2 m working diameter that could be guaranteed for many hours. The field work and some preliminary results are described.

46-2143
Ecosystem of arctic sea ice. [Ekosistema arkticheskogo morskogo l'da],
Mel'nikov, I.A., Moscow, AN SSSR Institut okeanologii, 1989, 191p., In Russian with English summary and table of contents. Refs. p.159-170.
Ecosystems, Sea ice, Plankton, Ecology, Plants (botany), Marine biology, Microbiology.

46-2144
Railroads in river valleys. (Zheleznye dorogi v dolinakh rek).
Pereselenkov, G.S., Moscow, Transport, 1991, 343p., In Russian. 115 refs.
Railroads, Valleys, Embankments, River ice, Flooding, Roadbeds, Countermeasures, Design, Analysis (mathematics).

46-2145
On the nature and significance of the Antarctic Slope Front.
Jacobs, S.S., *Marine chemistry*, Nov. 1991, 35(1-4), p.9-24, 46 refs.
Ocean currents, Hydrography, Sea ice.
The region near the edge of the continental shelf around Antarctica is the primary site for renewal of antarctic surface waters and the deepest layers of the World Ocean. Here the Circumpolar Deep Water (CDW) reservoir approaches the sea surface and is transformed into a variety of surface, slope and shelf waters. It is the locus of enhanced exchange of heat, salt, gases and freshwater between the ocean, atmosphere, sea ice and glacial ice, and of nutrient and particulate material transport on and off the continental shelf. Rejuvenated near-surface waters here mix back into the deep ocean to modify the CDW and form Antarctic Bottom Water. The Antarctic Slope Front is a common oceanographic feature near the shelf break and has a major bearing on these processes. This topographically controlled front is marked by strong subsurface gradients in ocean temperature and chemistry, and by stronger alongshore currents than most of the adjacent continental shelf. It is one of the preferred routes for icebergs moving westward along the continental margin, and is characterized by regionally lower winter sea ice cover. There is significant evidence for regionally higher biological productivity along the Antarctic Slope Front. (Auth.)

46-2146
Voyage of iceberg B-9.
Jacobs, S.S., *American scientist*, Jan.-Feb. 1992, Vol.80, p.32-42, 21 refs.
Icebergs, Ocean currents, Drift.
Iceberg B-9 broke off from the Ross Ice Shelf in Oct. 1987 at a shelf indentation known since 1908 as the Bay of Whales. It was initially 154 km long (size of Long Island) with a deep keel which caused it to drift with deep sub-surface currents rather than with the surface winds. An Argos system transmitter was dropped on B-9 and locked in to TIROS, enabling precise, continuous tracking. The twists and turns of the drift course are discussed and some of the unknowns of its voyage are noted; specifically, it is not easily determined if an iceberg is grounded or beset in the pack. B-9 has broken into three sections, B-9a, b, and c. B-9c is the smallest segment and appears to be trapped behind B-9b near Cape Hudson on the George V Coast. All three pieces were sighted in the fall, 1991.

46-2147
Trace metal distributions at an Arctic Ocean ice island.
Yeats, P.A., et al, *Marine chemistry*, May 1991, 33(3), p.261-277, 30 refs.
Westerlund, S.
Ice islands, Metals, Hydrography, Chemical composition.

46-2148
Application of pile foundations with grillage in frost zone of heaving soils.
Shuliat'ev, O.A., et al, *Soil mechanics and foundation engineering*, Sep. 1991, 28(2), p.59-62, Translated from Osnovaniia, fundamenty i mekhanika gruntov, Mar.-Apr., 1991. 2 refs.
Kuzevanov, V.V., Kemerov, V.D.
Cold weather construction, Dislocations (materials), Pile structures, Foundations, Frost heave, Countermeasures, Frozen ground mechanics, Engineering geology, Mechanical tests.

46-2149
Aqueous propylene-glycol concentrations for the freeze protection of thermosyphon solar energy water heaters.
Norton, B., et al, *Solar energy*, 1991, 47(5), p.375-382, 10 refs.
Edmonds, J.E.J.
Water pipes, Antifreezes, Frost protection, Radiant heating, Cold weather performance, Solar radiation, Simulation, Freezing points.

46-2150
Fracture toughness and defect assessment of low-temperature carbon steel flanges.
Bartlett, R.A., et al, *International journal of pressure vessels and piping*, 1991, 48(3), p.263-291, 21 refs.
Frost, S.R., Bowen, P.
Gas pipelines, Steel structures, Low temperature tests, Joints (junctions), Cracking (fracturing), Impact tests, Microstructure, Specifications, Liquified gases.

46-2151
Luminescence dating of Quaternary sediments. (Lumineszenzdatierung quartärer Sedimente).
Stoltz, W., et al, *Isotopenpraxis*, 1990, 26(11), p.506-511, In German with English summary. 96 refs.
Krbetschek, M.
Quaternary deposits, Age determination, Luminescence, Sediments, Glacial deposits.

46-2152
Sticking probability of H and D atoms on amorphous ice: a computational study.
Buch, V., et al, *Astrophysical journal*, Oct. 1, 1991, 379(2)Pt.1, p.647-652, 37 refs.
Zhang, Q.
Extraterrestrial ice, Amorphous ice, Ice physics, Molecular structure, Coalescence, Ice vapor interface, Molecular energy levels, Temperature effects, Simulation.

46-2153
Quaternary permafrost in China.
Zhou, Y.W., et al, *Quaternary science reviews*, 1991, 10(6), p.511-517, 31 refs.
Qiu, G.Q., Guo, D.X.
Permafrost distribution, Quaternary deposits, Pleistocene, Periodic variations, Paleoclimatology, Geocryology, China.

46-2154
Parametric estimation of the sequence of transitions between crystallographic phases.
Liakhov, G.A., et al, *Soviet physics—Lebedev Institute reports*, 1989, No.11, p.19-23, Translated from Kratkie soobshcheniia po fizike. 6 refs.
Mazo, D.M.
Ice physics, Ice crystal structure, Phase transformations, Solid phases, Classifications, Molecular structure, Anisotropy, Liquid phases.

46-2155
Simple model of shock-wave attenuation in snow.
Johnson, J.B., *Journal of glaciology*, 1991, 37(127), MP 3012, p.303-312, 12 refs.
Snow cover effect, Snow compaction, Shock waves, Wave propagation, Attenuation, Explosion effects, Snow mechanics, Mathematical models.
A simple momentum model, assuming that snow compacts along a prescribed pressure-density curve, is used to calculate the pressure attenuation of shock waves in snow. Four shock-loading situations are examined: instantaneously applied pressure impulses for one-dimensional, cylindrical and spherical shock-wave geometries, and a one-dimensional pressure impulse of finite duration. Calculations show that for an instantaneously applied impulse the pressure attenuation for one-dimensional, cylindrical and spherical shock waves is determined by the pressure density compaction curve of snow. The shock-wave pressure in snow for a finite-duration pressure impulse is determined by the pressure impulse versus time profile during the time interval of the impulse. After the pressure impulse ends, shock-wave pressure attenuation is the same as for an instantaneously applied pressure impulse containing the same total momentum. Pressure attenuation near a shock-wave source, where the duration of the shock wave is relatively short, is greater than for a shock wave farther from a source where the shock wave has a relatively long duration. Shock- wave attenuation in snow can be delayed or reduced by increasing the duration of a finite-duration pressure impulse. A sufficiently long-duration impulse may result in no shock-wave pressure attenuation in a shallow snow cover.

46-2156
Observations on Speke Glacier, Ruwenzori Range, Uganda.
Kaser, G., et al, *Journal of glaciology*, 1991, 37(127), p.313-318, 26 refs.
Noggler, B.
Glacier surveys, Glaciology, Glacier oscillation, Mountain glaciers, Periodic variations, Glacier mass balance, Glacier tongues, Climatic factors, Uganda—Speke Glacier.

46-2157
Fracture of ice on scales large and small: arctic leads and wing cracks.
Schulson, E.M., et al, *Journal of glaciology*, 1991, 37(127), p.319-322, 12 refs.
Hibler, W.D., III.
Sea ice, Ice cover strength, Ice cracks, Ice mechanics, Crack propagation, Stress concentration, Cracking (fracturing), Mechanical test, Loading.

46-2158
Snow-stratification investigation on an antarctic ice stream with an X-band radar system.
Forster, R.R., et al, *Journal of glaciology*, 1991, 37(127), p.323-325, 11 refs.
Davis, C.H., Rand, T.W., Moore, R.K.
Glacier surfaces, Firn stratification, Snow cover structure, Snow surveys, Subsurface investigations, Radar echoes, Layers, Snow accumulation.
An X-band FM-CW radar was used to determine the feasibility of observing annual snow accumulation layers in Antarctica with a high-resolution inexpensive radar system. The formation of layering boundaries, their resultant electromagnetic discontinuity and their detection by reflected energy are presented. Large returns from depths corresponding to reasonable positions for annual layers were found. The average accumulation rates calculated from the radar returns agree with those measured in a previous pit study done in the same area. The detection of the annual accumulation layers with this system implies a simple, inexpensive mobile radar could be used to profile large areas, allowing the distorting effects of local topography to be removed. This type of system with a concurrent pit study could provide insight into the effect of subsurface strata on spaceborne or airborne microwave remote sensing. (Auth.)

46-2159
Paleothermometry by control methods.
MacAyeal, D.R., et al, *Journal of glaciology*, 1991, 37(127), p.326-338, 14 refs.
Firestone, J., Waddington, E.D.
Paleoclimatology, Boreholes, Temperature measurement, Ice temperature, Ice sheets, Surface temperature, Temperature variations, Accuracy, Analysis (mathematics), Greenland.

46-2160
Freezing-rate effects on the physical characteristics of basal ice formed by net adfreezing.
Hubbard, B., *Journal of glaciology*, 1991, 37(127), p.339-347, 35 refs.
Glacier ice, Glaciology, Glacier beds, Ice formation, Regelation, Freezing rate, Freezing front, Subsurface investigations, Ice crystal structure.

46-2161
Non-climatic control of glacier-terminus fluctuations in the Wrangell and Chugach Mountains, Alaska, U.S.A.
Sturm, M., et al, *Journal of glaciology*, 1991, 37(127), MP 3013, p.348-356, 49 refs.
Hall, D.K., Benson, C.S., Field, W.O.
Glacier oscillation, Glacier tongues, Glacier surveys, Glacier flow, Volcanoes, Tidal currents, Meltwater, Runoff, Periodic variations, United States—Alaska—Wrangell Mountains.
Fluctuations of glacier termini were studied in two regions in Alaska. In the Wrangell Mountains, 15 glaciers on Mount Wrangell, an active volcano, have been monitored over the past 30 years by surveying, photogrammetry and satellite. Results, which are consistent between different methods of measurement, indicate that the termini of most glaciers were stationary or retreating slightly. The terminus fluctuations of six tidewater and near- tide-water glaciers in College Fjord, Prince William Sound, have also been monitored since 1931 by surveying, photogrammetry and, most recently, by satellite imagery. Harvard Glacier, a 40 km long tide-water glacier, has been advancing at an average rate of nearly 20 m/yr since 1931, while the adjacent Yale Glacier has retreated at approximately 50 m/yr during the same period though, for short periods, both of these rates have been much higher. The striking contrast between the terminus behavior of Yale and Harvard Glaciers, which parallel each other in the same fjord, and are derived from the same snowfield, supports the hypothesis that their terminus behavior is largely the result of dynamic controls rather than changes in climate.

46-2162
Stratigraphy, stable isotopes and salinity in multi-year sea ice from the rift area, south George VI Ice Shelf, Antarctic Peninsula.
Tison, J.L., et al, *Journal of glaciology*, 1991, 37(127), p.357-367, 23 refs.
Morris, E.M., Souchez, R.A., Jouzel, J.
Sea ice, Ice shelves, Ice cores, Stratigraphy, Isotope analysis, Ice growth, Drill core analysis, Ice melting, Ice water interface.
Results from a detailed profile in a 5.54 m multi-year sea-ice core from the rift area in the southern part of George VI Ice Shelf are presented. Stratigraphy, stable isotopes and Na content are used to investigate the growth processes of the ice cover and to relate them to melting processes at the bottom of the ice shelf. The thickest multi-year sea ice in the sampling area appears to be second-year sea ice that has survived one melt season. Combined salinity/stable-isotope analyses show large-scale sympathetic fluctuations that can be related to the origin of the present water. Winter accretion represents half of the core length and mainly consists of frazil ice of normal sea-water origin. However, five major dilution events of sea water, with fresh-water input from the melting base of the ice shelf reaching 20% on two occasions, punctuate this winter accretion. Two of them correspond to platelet-ice production, which is often related to the freezing of ascending supercooled water from the bottom of the ice shelf. Brackish ice occurs between 450 and 530 cm in the core. It is demonstrated that this results from the freezing of brackish water (Jeffries and others, 1989) formed by mixing of normal sea water with melted basal shelf ice, with dilution percentages of maximum 80% fresh water. (Auth.)

46-2163
Surficial glaciology of Jakobshavns Isbrae, West Greenland: part I. Surface morphology.
Echelmeyer, K., et al, *Journal of glaciology*, 1991, 37(127), p.368-382, 33 refs.
Clarke, T.S., Harrison, W.D.
Glacier surveys, Glacier surfaces, Surface structure, Glacier thickness, Glacier flow, Glaciology, Glacial hydrology, Calving, Slope orientation, Greenland.

46-2164
Snow-accumulation variability from seasonal surface observations and firn-core stratigraphy, eastern Wilkes Land, Antarctica.
Goodwin, I.D., *Journal of glaciology*, 1991, 37(127), p.383-387, 7 refs.
Snow accumulation, Snow stratigraphy, Firn stratification, Glacier mass balance, Atmospheric circulation, Isotope analysis, Seasonal variations, Drill core analysis.
Annual accumulation records were derived from two firn cores drilled in eastern Wilkes Land. The accumulation records, spanning the period 1930-85, show that annual accumulation has increased by 25% from 1960 to 1985, resulting in the highest accumulation rates in the 55 year records. Annual accumulation layers were identified in the firn cores using a firn-stratigraphic model (based on the observed characteristics and variability of the seasonal snow- surface layer), together with seasonal oxygen-isotope ratios. The accumulation records support other evidence for a similar recent increase across Antarctica. The greater increase over the long- term mean for 1930-85 in eastern Wilkes Land was observed on a northeast aspect slope near Terre Adelie. It is suggested that the increase is the result of changes in the general atmospheric circulation pattern which have produced a higher annual frequency of precipitation events. (Auth. mod.)

46-2165
Duration of the active phase on surge-type glaciers: contrasts between Svalbard and other regions.
Dowdeswell, J.A., et al, *Journal of glaciology*, 1991, 37(127), p.388-400, 59 refs.
Hamilton, G.S., Hagen, J.O.
Glacier surges, Glacier surveys, Glacier flow, Glacier mass balance, Periodic variations, Time factor, Glacier oscillation, Norway—Svalbard.

46-2166
Thermal behaviour of glacier and laboratory ice.
Nye, J.F., *Journal of glaciology*, 1991, 37(127), p.401-413, 22 refs.
Glacial hydrology, Ice water interface, Glacier heat balance, Thermal diffusion, Melting points, Ice temperature, Thermal analysis, Impurities, Mathematical models.

46-2167
Estimating ice temperature from short records in *thermally disturbed boreholes.*
Humphrey, N., *Journal of glaciology*, 1991, 37(127), p.414-419, 7 refs.
Glacier ice, Boreholes, Ice temperature, Temperature measurement, Sensors, Forecasting, Accuracy, Thermal analysis, Mathematical models, Antarctica—Ice Stream B.
A technique to estimate undisturbed ice temperature is discussed for sensors placed in boreholes that have been heated to the melting point during drilling, and for which only a limited time span of temperature record is available. A short temperature record after the hole refreezes commonly results when using hot- water or steam drills, where measurements are constrained by logistics, ice deformation, sensor drift or other problems, or where the refreezing time is long because of near-freezing ice temperatures or large hole sizes. Short data records are also typical in ongoing drilling programs where temperature information may be necessary for the program itself. It is shown that estimates of undisturbed temperatures can be made from records of temperature that extend only marginally beyond the initial refreezing. Complex effects of hole size, heating history, and the thermodynamic and geometrical effects of a moving boundary (the freezing borehole walls) are important to temperature decay immediately after freeze-up, so that the standard technique of comparing temperature decay to an inverse of time model is not applicable, and comparison has to be made to a numerical model of heat flow to a refreezing borehole. Data from Ice Stream B, Antarctica, are compared to the numerical model to illustrate the technique. Data are also compared to simpler (inverse time) thermal models, and a potential for error is pointed out, since a short data record can be spuriously matched with the simpler one or two free-parameter models. (Auth. mod.)

46-2168
Efficient method for a delayed and accurate characterization of snow grains from natural snowpacks.
Brun, E., et al, *Journal of glaciology*, 1991, 37(127), p.420-422, 4 refs.
Pahaut, E.
Snow crystal structure, Snow morphology, Sampling, Storage, Classifications, Snow survey tools, Snow cover structure, Laboratory techniques.

46-2169
1990-1991 Australia Antarctic Research Program. Initial summary of research activity.
Australia. Antarctic Division, Kingston, Tasmania, 1992, 207p.
Research projects, Expeditions.
Brief summaries are provided of research conducted during the 1989 winter and 1990-1991 summer by ANARE in chemistry, earth sciences, logistics, environmental studies, glaciology, history, human biology and medicine, life sciences, mapping, meteorology, oceanography, physics, political science, psychology and personnel. Each summary shows, with variations, title, principal investigator with affiliation, location of research site, project description, aim of research, field work carried out, difficulties encountered, significance of findings, planned dissemination of results, and scientific equipment used. Following the summaries are two appendices: an author index and addresses of principal investigators.

46-2170
Arctic obligation. Report of the U.S. Arctic Research Commission to the President and the Congress of the United States of America for the period 1 October 1990-30 September 1991.
U.S. Arctic Research Commission, Washington, D.C., Jan. 31, 1992, 39p., Refs. passim.
Research projects, Natural resources, Economic development, Environmental protection, International cooperation, Legislation, Organizations.

46-2171
Physics of climate.
Peixoto, J.P., et al, New York, American Institute of Physics, 1992, 520p. (Pertinent p.207-215,302-307,-353-364), Refs. p.497-507.
Oort, A.H.
Atmospheric physics, Atmospheric circulation, Air ice water interaction, Snow cover, Ice cover, Sea ice, Hydrologic cycle.

46-2172
Glacial marine sedimentation; paleoclimatic significance.
Anderson, J.B., ed, *Geological Society of America. Special paper*, 1991, No.261, 232p., Refs. passim.
For individual papers see 46-2173 through 46- 2186 or E-45550 through E-45552 and F-45549.
Ashley, G.M., ed.
Glacial deposits, Marine deposits, Bottom sediment, Paleoclimatology, Sediment transport, Stratigraphy.
The chapters in this volume deal with the general topic of glacial marine sedimentation and stem from a symposium held at the 1988 Geological Society of America annual meeting in Denver. An objective of the symposium was to attempt to identify sedimentary criteria and facies models that can be used to characterize the glacial-climatic setting of ancient sequences. Four of the papers presented are pertinent to Antarctica.

46-2173
Sedimentary facies associated with Antarctica's floating ice masses.
Anderson, J.B., et al, *Geological Society of America. Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.1-25, 51 refs.
Kennedy, D.S., Smith, M.J., Domack, E.W.
Glacial deposits, Marine deposits, Bottom sediment, Ice shelves, Paleoclimatology, Ice rafting, Glacier tongues, Drill core analysis.
The largest floating ice masses of Antarctica are the Ross, Ronne-Filchner, and Amery ice shelves, which are the floating extensions of the ice sheet and occur at the confluence of large ice streams. In the Ross Sea, surface sediments consist of diatomaceous glacial marine sediments. These sediments are relatively thin over most of the continental shelf, where they rest in sharp contact on basal tills. Transitional glacial marine sediments are rare, and basal tills grade offshore into bioclastic carbonates. These stratigraphic relations imply that the ice sheet was fully grounded on the shelf during the last glacial maximum, and that seaward of this expanded ice sheet the sea floor was starved of terrigenous sediment. The retreat of the ice sheet from the continental shelf was so rapid that sub-ice shelf sediments were not deposited. Rapid retreat is expected within a foredeepened shelf setting. Fringing ice shelves represent the second most extensive bodies of floating glacial ice in Antarctica. The Larsen Ice Shelf has associated with it an extensive diamicton facies. These diamictons are overlain by predominantly terrigenous glacial marine sediments whose grain size shows clear influence of marine currents on sedimentation. The third type of ice shelf setting studied (the George VI Ice Shelf) is confined by valley walls. It is the only one of the three examples studied in which an ice shelf recessional lithofacies is clearly recognized. This lithofacies is composed of transitional glacial marine sediments that grade upward into terrigenous muds, which are inferred to be derived from subglacial meltwater outflow. The sub-ice shelf facies is overlain by diatomaceous muds and oozes, which indicates open-marine conditions. Ice tongues, while small in size, represent a significant mode of ice drainage from the antarctic continent. The two examples studied include the shelf areas adjacent to the Drygalski Ice Tongue and the Mertz and Ninnis Ice Tongues. Marine facies associated with ice tongues contain a large biogenic compound, which is primarily siliceous. (Auth. mod.)

46-2174
Facies distribution resulting from sedimentation under polar interglacial climatic conditions within a high-latitude marginal basin, McMurdo Sound, Antarctica.
Bartek, L.R., et al, *Geological Society of America Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.27-49, 61 refs.
Anderson, J.B.
Glacial deposits, Marine deposits, Bottom sediment, Paleoclimatology, Drill core analysis, Ice rafting, Stratigraphy, Antarctica—McMurdo Sound.
A detailed study of cores and high-resolution seismic data collected in McMurdo Sound was conducted to improve understanding of the facies architecture resulting from sedimentation under polar interglacial conditions. Sedimentary sequences deposited within a marginal basin, under polar interglacial and temperate glacial regimes, can be distinguished by the presence of a diverse array of facies and an absence of thick and widespread clayey silt facies in the polar interglacial deposits. Thirteen facies have been observed in the cores recovered from polar interglacial deposits in McMurdo Sound. Sedimentation on the eastern side of the sound is characterized by deposition of sediment gravity flow deposits. Thickly bedded turbidites, cohesionless debris flows, and density- modified grain flows have been deposited on and at the base of the eastern slope of the sound, while thinly bedded, coarse-grained, and fine-grained distal turbidites occur in the central basin. Within the Erebus Basin, sedimentary deposits consist primarily of diatomaceous ooze and mud, and coarse-grained ice-rafted debris. The facies of the basin also show an interfonguing relationship with the sediments of the eastern and western slopes of the sound. Sedimentation on the western slope of McMurdo Sound is dominated by deposition of ice-rafted eolian debris from the south, primary eolian deposition, turbidites with sources on the western shelf and slope, and a minor amount of ice-rafted eolian debris from the west. Deposition of ice-rafted debris from the west and coarse ice-rafted debris from the McMurdo Ice Shelf comprise the primary modes of sedimentation on the upper portion of the western slope and the western shelf. (Auth. mod.)

46-2175
Laminated sediments in prodeltaic deposits, Glacier Bay, Alaska.
Phillips, A.C., et al, *Geological Society of America. Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.51-60, 25 refs.
Smith, N.D., Powell, R.D.
Glacial deposits, Marine deposits, Bottom sediment, Sediment transport, Deltas, Sedimentation, Outwash, Stratigraphy, United States—Alaska—Glacier Bay.

46-2176
Ice-proximal sediment accumulation rates in a temperate glacial fjord, southeastern Alaska.
Cowan, E.A., et al, *Geological Society of America. Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.61-73, 49 refs.
Powell, R.D.
Glacial deposits, Sediment transport, Bottom sediment, Outwash, Sedimentation, Marine deposits, Ice rafting, United States—Alaska—Glacier Bay.

46-2177
Grounding-line systems as second-order controls on fluctuations of tidewater termini of temperate glaciers.
Powell, R.D., *Geological Society of America. Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.75-93, 86 refs.
Glacial deposits, Bottom sediment, Sediment transport, Glacier oscillation, Marine deposits, Glacier tongues, Glacier mass balance, United States—Alaska—Glacier Bay.

46-2178
Glacial marine sedimentation from tidewater glaciers in the Canadian High Arctic.
Stewart, T.G., *Geological Society of America. Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.95-105, 62 refs.
Glacial deposits, Bottom sediment, Marine deposits, Sediment transport, Paleoclimatology, Stratigraphy, Outwash, Canada—Northwest Territories—Ellesmere Island.

46-2179
Sedimentology of late Pleistocene (Laurentide) deglacial- phase deposits, eastern Maine; an example of a temperate marine grounded ice-sheet margin.
Ashley, G.M., et al, *Geological Society of America. Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.107-125, 52 refs.
Boothroyd, J.C., Borns, H.W., Jr.
Glacial deposits, Marine deposits, Paleoclimatology, Quaternary deposits, Grounded ice, Moraines, Stratigraphy, Pleistocene, United States—Maine.

46-2180
Structural control of deposition by Pleistocene tidewater glaciers, Gulf of Maine.
Crossen, K.J., *Geological Society of America. Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.127-135, 38 refs.
Glacial deposits, Marine deposits, Paleoclimatology, Quaternary deposits, Pleistocene, Glaciation, Glacial geology, United States—Maine.

46-2181
Seismic stratigraphy of glacial marine units, Maine inner shelf.
Belknap, D.F., et al, *Geological Society of America. Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.137-157, 95 refs.
Shipp, R.C.
Glacial deposits, Marine deposits, Bottom sediment, Paleoclimatology, Seismic surveys, Stratigraphy, Glaciation, Quaternary deposits, United States—Maine.

46-2182
Yakataga Formation; a late Miocene to Pleistocene record of temperate glacial marine sedimentation in the Gulf of Alaska.
Eyles, C.H., et al, *Geological Society of America. Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.159-180, 68 refs.
Eyles, N., Lagoe, M.B.
Bottom sediment, Glacial deposits, Marine deposits, Sediment transport, Paleoclimatology, Stratigraphy, Glaciation, Tectonics, United States—Alaska—Gulf of Alaska.

46-2183
Paleoclimatic setting of the late Paleozoic marine ice sheet in the Karoo Basin of southern Africa.
Visser, J.N.J., *Geological Society of America. Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.181-189, 31 refs.
Glacial deposits, Marine deposits, Paleoclimatology, Glaciation, Stratigraphy, Tectonics, Ice shelves, South Africa.

46-2184
Comparisons in depositional style of "polar" and "temperate" glacial ice; Late Paleozoic Whiteout Conglomerate (West Antarctica) and late Proterozoic Mineral Fork Formation (Utah).
Matsch, C.L., et al, *Geological Society of America. Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.191-206, 51 refs.
Ojakangas, R.W.
Glacial deposits, Marine deposits, Sediment transport, Paleoclimatology, Glacial erosion, Ice shelves, Stratigraphy, Antarctica—Ellsworth Mountains, United States—Utah.
Two thick sequences of ancient glacial and glacial marine rocks, the late Proterozoic Mineral Fork Formation of Utah and the Late Paleozoic Whiteout Conglomerate of West Antarctica, reflect similarities and differences in temperature regimes of the glacial delivery systems, climatic settings in the zones of ablation, and nature of the glacier interfaces with the depositional environments. Both units attain thicknesses of about 1,000 m and both are segments of widely distributed glaciogenic deposits covering thousands of sq km. They appear to represent significant erosion of platformal areas beneath basal ice at or near its melting point. In the Mineral Fork Formation, facies patterns indicate supraglacial melt-out, sediment gravity flow, and deposition from meltwater streams, all characteristics of glacier ice where the climate is subpolar or temperate in the zone of ablation. In contrast, the Whiteout Conglomerate lacks facies indicative of supraglacial melting; the absence of meltwater-generated fluvial and plume deposits is especially striking. Rather, subglacial melt-out from grounded ice and basal melting of ice shelves and perhaps icebergs, all accompanied by vertical settling, are indicated. Lateral changes represent a regional transition from grounded marine-based glaciers at the pressure melting point in the basal zone to a shelf of polar ice, warmed sufficiently at the base to release sediment there by melting as well as by iceberg calving. (Auth. mod.)

46-2185
Late Proterozoic (Sturtian) succession of the North Flinders Basin, South Australia; an example of temperate glaciation in an active rift setting.
Young, G.M., et al, *Geological Society of America. Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.207-222, 56 refs.
Gostin, V.A.
Glacial deposits, Marine deposits, Paleoclimatology, Sediment transport, Glaciation, Glacial erosion, Stratigraphy, Australia.

46-2186
Glacial marine sedimentation; paleoclimatic significance; a discussion.
Anderson, J.B., et al, *Geological Society of America. Special paper*, 1991, No.261, Glacial marine sedimentation; paleoclimatic significance. Edited by J.B. Anderson and G.M. Ashley, p.223-226, 28 refs.
Ashley, G.M.
Glacial deposits, Marine deposits, Bottom sediment, Paleoclimatology, Sediment transport.
Studies from modern environments of the Arctic and Antarctica suggest that, in general, the extremes of "polar" and "temperate" glacial marine sediments can be differentiated, but by using glacial marine deposits and associated geomorphologic features, not subglacial deposits. These differences are manifested in the sedimentary records of Paleozoic and late Precambrian sequences, indicating that paleoclimatic information can be derived from these rocks. Studies of Quaternary and Cenozoic deposits reveal that temperate, subpolar, and polar sedimentary facies may occur over a wide spectrum of latitudes. Thermal characteristics of ice sheets are a function of climate-driven mass balance, which would not be expected to have remained fixed at specific latitudes throughout glacial/interglacial cycles. Thus, the conceptual (thermal) models of ice sheets, warm-based (temperate) versus cold-based (polar- subpolar), should not be directly correlated with the climate regimes existing in present-day temperate and polar latitudes.

46-2187
On the failure of water to freeze from its surface.
Elbaum, M., et al, *Journal de physique I*, Dec. 1991, 1(12), p.1665-1668, 5 refs.
Schick, M.
Water, Freezing points, Films, Ice water interface, Surface energy, Dielectric properties, Nucleation, Analysis (mathematics).

46-2188
Compression characteristics of excess activated sludges treated by freezing-and-thawing process.
Kawasaki, K., et al, *Journal of chemical engineering of Japan*, Dec. 1991, 24(6), p.743-748, 15 refs.
Matsuda, A., Mizukawa, Y.
Sludges, Waste treatment, Freeze thaw cycles, Sediments, Physical properties, Porosity, Analysis (mathematics).

46-2189
Analysis of close-contact melting for octadecane and ice inside isothermally heated horizontal rectangular capsule.
Hirata, T., et al, *International journal of heat and mass transfer*, Dec. 1991, 34(12), p.3097-3106, With French, German and Russian summaries. 8 refs.
Makino, Y., Kaneko, Y.
Ice melting, Heat transfer, Convection, Ice solid interface, Phase transformations, Heat recovery, Liquid phases, Analysis (mathematics).

46-2190
Organic matter available for denitrification in different soil fractions: effect of freeze/thaw cycles and straw disposal.
Christensen, S., et al, *Journal of soil science*, Dec. 1991, 42(4), p.637-647, 25 refs.
Christensen, B.T.
Organic soils, Soil freezing, Freeze thaw cycles, Decomposition, Soil microbiology, Soil tests, Soil science, Biomass, Soil aggregates.

46-2191
Arctic offshore potential.
Dees, J.L., *Geophysics: the leading edge of exploration*, Sep. 1991, 10(9), p.42-44.
Offshore drilling, Petroleum industry, Exploration.

46-2192
IWAIS '90.
International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990, Tokyo, 1990, Var. p., Refs. passim. For individual papers see 45-3745 and 46-2193 through 46-2281.
Power line icing, Ice accretion, Ice loads, Snow loads, Cloud droplets, Wind pressure, Ice electrical properties, Ice storms, Ship icing, Sea spray.

46-2193
Meteorology of heavy snowfall in Japan.
Miyazawa, S., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A0/1/1-A0/1/7.
Snowfall, Snowstorms, Precipitation (meteorology), Meteorological factors, Japan.

46-2194
Glaciology and icing on structures.
Itagaki, K., MP 3014, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A0/2/1-A0/2/6, 12 refs.
Icing, Ice accretion, Ice adhesion, Ice solid interface, Snow crystals, Snow removal.
Various aspects of the problems involved in atmospheric icing and ice adhesion are discussed. In this paper examples are given of hidden and unexpected mechanisms that may play an important role in ice adhesion.

46-2195
Ice and snow accretion on structures in Japan.
Sakamoto, Y., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A0/3/1-A0/3/8, 12 refs.
Ship icing, Power line icing, Ice accretion, Snow loads.

46-2196
Measurement of relative humidity in clouds.
Itagaki, K., et al, MP 3015, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A1/1/1-A1/1/4, 5 refs.
Lemieux, G.E.
Humidity, Cloud droplets, Cloud physics, Icing, Dew point, Hygrometers.
Attempts were made to determine if relative humidity (RH) between cloud droplets may be below water saturation when extensive ice particles are present. RH and temperature measurements behind a cylindrical shield were compared with *in-stream measurements*. Dew *point measurements under certain* conditions were more than 1 C lower behind the shield than in the stream, which indicates that RH is 10% below the water saturation at that temperature.

46-2197
Measuring icing cloud properties by the rotating multicylinder.
Makkonen, L., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A1/2/1-A1/2/6, 19 refs.
Lehtonen, P.
Icing, Cloud droplets, Unfrozen water content, Particle size distribution, Ice accretion.

46-2198
Small up-stand supercooled cloud tunnel for ice (snow) crystal growth and its measuring system.
Gong, N.H., et al, *International Workshop on Atmospheric Icing of Structures*, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A1/3/1-A1/3/4, 6 refs.
Tao, S.W.
Ice crystal growth, Wind tunnels, Supercooled clouds, Snow crystal growth, Unfrozen water content.

46-2199
Development of field measurement technique and data analysis for transmission line icing.
Krómer, I., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A1/4/1-A1/4/6, 5 refs.
Teucher, F.
Power line icing, Ice loads.

46-2200
Development of a sensor for the detection of atmospheric ice.
Inkpen, S., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A1/5/1-A1/5/6, 2 refs.
Nolan, C., Oleskiw, M.M.
Icing, Ice detection, Ice accretion, Ice electrical properties, Measuring instruments.

46-2201
Meteorological analysis of glaze occurrence in Japan.
Ishihara, K., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A1/6/1-A1/6/4, 6 refs.
Tadokoro, Y.
Glaze, Ice storms, Ice forecasting, Frost forecasting, Meteorological factors, Cloud physics, Snow air interface, Analysis (mathematics), Japan.

46-2202
Ice accretion environment on Mt. Ibuki in Japan's central mountainous region.
Kawamura, R., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A1/7/1-A1/7/6, 3 refs.
Tadokoro, Y., Hatayama, G.
Power line icing, Ice accretion, Meteorological factors.

46-2203
Meteorological environment of icing and analysis of relationship between upper layer air stratification and significant ice accretion in the mountainous regions of Kanto area in Japan.
Nagano, M., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A1/8/1-A1/8/7, 2 refs.
Power line icing, Ice accretion, Ice storms, Atmospheric physics, Meteorological factors, Synoptic meteorology.

46-2204
Investigation of the vertical gradient of ice deposit above earth level.
Popolanský, F., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A1/10/1-A1/10/5, 4 refs.
Kružík, J.
Power line icing, Ice loads, Design criteria.

46-2205
Icing mechanism and de-icing method of overhead transmission lines and insulator string.
Wu, S.L., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A1/11/1-A1/11/6, 6 refs.
Jiang, X.L., Wan, Q.F.
Power line icing, Ice loads, Electrical insulation, Ice control.

46-2206
Loading condition of the transmission line due to snow and ice accretion in Young-Dong district.
Kim, J.B., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A1/12/1-A1/12/4, 1 ref.
Seo, J.Y.
Power line icing, Ice loads, Ice accretion, Snow loads.

46-2207
Characteristics of icing observed at the Höghetta ice dome in northern Spitsbergen.
Izumi, K., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A1/13/1-A1/13/4, 7 refs.
Icing, Ice accretion, Meteorological factors, Ice air interface, Glacial meteorology, Norway - Spitsbergen.

46-2208
Studies on the growth process of ice monster.
Yano, K., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A1/14/1-A1/14/4.
Kato, W., Sato, A.
Icing, Ice accretion, Ice adhesion, Trees (plants).

46-2209
Laboratory study of droplet trajectories using LDV.
Yoon, B.M., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A2/1/1-A2/1/6, 8 refs.
Ettema, R.
Icing, Ice accretion, Drops (liquids), Velocity measurement, Wind tunnels, Lasers.

46-2210
Three-dimensional aeroelastic theoretical model of an overhead line conductor.
Koutselos, L.T., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A2/2/1-A2/2/5, 4 refs.
Power line icing, Ice loads, Ice air interface, Ice accretion, Wind pressure, Wind factors, Vibration, Air flow, Mathematical models.

46-2211
Morphology and density of ice accreted on cylindrical collectors at low values of impaction parameter. Part I: fixed deposits.
Levi, L., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A2/4/1-A2/4/6, 15 refs. For another version see 46-1552.
Nasello, O.B., Prodi, F.
Ice density, Ice accretion, Icing, Ice solid interface, Cloud droplets, Ice formation.

46-2212
Morphology and density of ice accreted on cylindrical collectors at low values of impaction parameter. Part II: rotating deposits.
Prodi, F., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A2/5/1-A2/5/6, 8 refs. For another version see 46-1553.
Nasello, O.B., Lubart, L., Levi, L.
Ice density, Ice accretion, Icing, Ice solid interface, Cloud droplets, Ice formation.

46-2213
Theoretical study of air inclusions on rotating cylinders.
Personne, P., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A2/6/1-A2/6/3, 6 refs.
Duroure, C., Isaka, H.
Icing, Ice accretion, Ice air interface, Ice density, Bubbles.

46-2214
Theoretical models of rime and glaze accretion with application to freezing rain accretion on overhead transmission line conductors.
Poots, G., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A2/7/1-A2/7/7, 23 refs.
Skelton, P.L.I.
Power line icing, Ice accretion, Ice storms, Ice loads, Glaze, Air ice water interaction, Boundary value problems, Mathematical models, Stefan problem.

46-2215
Effects of cable twisting on atmospheric ice shedding.
McComber, P., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A2/8/1-A2/8/6, 14 refs.
Power line icing, Ice loads, Ice breaking, Ice accretion, Wind factors, Mathematical models.

46-2216
Simulation of the life cycle of ice loads on overhead conductors.
Izawa, T., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A2/9/1-A2/9/4, 2 refs.
Power line icing, Ice loads, Ice accretion, Ice forecasting, Mathematical models.

46-2217
Small-scale modelling of ice and wind loads.
Makkonen, L., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A2/10/1-A2/10/6, 22 refs.
Oleskiw, M.M., Lehtonen, P.
Icing, Ice loads, Wind pressure, Ice accretion, Mathematical models.

46-2218
Basic principles of ice-load mapping for the design and operation of overhead transmission lines in the USSR.
Golikova, T.N., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A3/1/1-A3/1/5, 6 refs.
Lomilina, L.E., Toporkova, G.D.
Power line icing, Ice loads, Mapping, Statistical analysis, Ice forecasting.

46-2219
Model of the accumulation of rime on electric power lines: application to overloads cartography.
MacCagnan, M., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A3/3/1-A3/3/6.
Personne, P.
Power line icing, Ice loads, Mapping, Statistical analysis, Ice forecasting.

46-2220
Spatial distribution of ice accretion within icing storms and within transmission lines routes.
Laflamme, J., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A3/4/1-A3/4/6, 3 refs.
Power line icing, Ice loads, Ice storms, Ice accretion, Canada - Quebec.

46-2221
Aerodynamic properties of natural rime ice samples.
Jones, K.F., et al, MP 3016, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A5/1/1-A5/1/6, 10 refs.
Govoni, J.W.
Icing, Ice loads, Wind pressure, Ice air interface, Ice accretion, Ice surface, Surface roughness.
Natural rime ice samples were collected on Mt. Washington on rods placed at the midsection of a diagonally oriented taut cable. Two rod samples were collected simultaneously on parallel cables. One of each pair was tested in the refrigerated wind tunnel at the University of Quebec at Chicoutimi to measure the lift and drag on the sample at different wind speeds. The second sample in the pair was used to determine the ice properties associated with the measured lift and drag. It was cut into slices whose mass and thickness were measured. The slices were photographed under crossed polarizers on a 1 cm grid, and the photographs were analyzed using a PC-based image processor to obtain the cross- sectional area and the rime surface topography. From these data the average sample density was determined and the surface roughness was characterized. The relationships among the icing conditions, ice density, roughness and wind loading were investigated.

46-2222
Application of phase-shifting transformers to the power line ice melting.
Kalinin, L.P., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A6/1/1-A6/1/4, 7 refs.
Soldatov, V.A.
Power line icing, Ice loads, Artificial melting, Electric equipment, Electric heating.

46-2223
Comprehensive report on problem of ice(snow)-line of power system in China.
Wu, S.L., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A4/1/1-A4/1/6, 4 refs.
Liu, Z.D.
Power line icing, Ice control, Ice loads, Countermeasures.

46-2224
Recent failure of a transmission line due to ice in Newfoundland.
Haldar, A., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A4/2/1-A4/2/6, 11 refs.
Power line icing, Ice loads, Ice storms, Accidents, Canada - Newfoundland.

46-2225
Ice load—reason for disasters on overhead lines in Slovenia, Yugoslavia.
Zadnik, B., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A4/3/1-A4/3/6, 3 refs.
Jakše, J., Kern, J., Šliber, F.
Power line icing, Ice loads, Ice storms, Accidents, Yugoslavia.

46-2226
Observation network for ice accretion and correction of data for determining ice loads for designing transmission power lines through mountain range.
Yamada, T., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A4/4/1-A4/4/6, 3 refs.
Fujishima, T., Sakamoto, Y., Tadokoro, Y.
Power line icing, Ice loads, Ice accretion, Design criteria, Wind pressure, Mountains.

46-2227
Measuring of ice and wind loads on a high mast in Sweden.
Fahleson, C., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A4/5/1-A4/5/6, 15 refs.
Power line icing, Ice loads, Wind pressure, Power line supports, Accidents, Sweden.

46-2228
Correlation of combined wind and ice occurrences.
Krishnasamy, S.G., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A4/6/1-A4/6/4, 2 refs.
Tabatabai, M., Meale, J.
Power line icing, Ice loads, Wind pressure, Canada Ontario.

46-2229
Statistical procedures for combined wind and ice loading assessment.
Csomor, M., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A4/7/1-A4/7/6, 7 refs.
Kovács, F., Kromer, I.
Power line icing, Ice loads, Wind pressure, Statistical analysis, Hungary.

46-2230
Improved model to estimate ice loads and combined wind and ice loadings based on climatological data.
Ervik, M., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A4/8/1-A4/8/4, 4 refs.
Fikke, S.M.
Power line icing, Ice loads, Wind pressure, Norway.

46-2231
Probabilistic design method of overhead lines exposed to combined wind and ice.
Goschy, B., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A4/9/1-A4/9/3, 4 refs.
Rezsöfi, F., Csomor, M.
Power line icing, Ice loads, Wind pressure, Statistical analysis.

46-2232
ISO—standard for atmospheric icing on structures.
Stöttrup-Andersen, U., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A4/11/1-A4/11/8.
Icing, Ice loads, Standards, Building codes.

46-2233
Observation of galloping of overhead transmission lines using optical fiber gyroscope.
Sonoi, Y., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A7/1/1-A7/1/4, 6 refs
Power line icing, Wind pressure, Vibration, Measuring instruments.

46-2234
Countermeasures for conductor galloping accidents on the overhead transmission lines in Hokkaido Electric Power Co., Inc.
Fujii, Y., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A7/2/1-A7/2/5, 4 refs.
Yamaoka, M., Kokubo, G., Wakahama, G.
Power line icing, Wind pressure, Vibration, Countermeasures.

46-2235
Verification test on 8-bundle conductor on the Oku-Nikko UHV test line.
Yanagisawa, T., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A7/3/1-A7/3/6, 10 refs.
Sukegawa, T., Akasaka, H., Matsuzaki, Y.
Power line icing, Ice loads, Wind pressure, Vibration.

46-2236
Use of detuning pendulums for control of galloping of single conductor and two- and four-conductor bundle transmission lines.
Havard, D.G., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A7/4/1-A7/4/6, 14 refs.
Pon, C.J.
Power line icing, Wind pressure, Vibration, Countermeasures.

46-2237
Observations and studies of conductor galloping at UHV test line.
Oura, K., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.A7/5/1-A7/5/4, 6 refs.
Okazato, A., Ando, H.
Power line icing, Wind pressure, Ice loads, Vibration.

46-2238
Icing of the wing and of the elevator of an aircraft.
Hoffmann, H.E., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B1/1/1-B1/1/4, 15 refs.
Aircraft icing, Ice accretion.

46-2239
Advances in aircraft icing forecast.
Fuchs, W., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B1/2/1-B1/2/2, 2 refs.
Schickel, K.P.
Aircraft icing, Ice forecasting.

46-2240
Universal flying particle camera.
Itagaki, K., et al, MP 3017, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B2/1/1-B2/1/4.
Ryerson, C.C.
Sea spray, Meteorological instruments, Photographic equipment, Particle size distribution, Measuring instruments.
A simple system for optically capturing airborne precipitation was developed using off-the-shelf components: a video camera, a Strobo-Tac strobe light system and a video recorder. The system was mainly designed to capture sea spray on board a ship, and thus was weathertight and included defrosters, washers, and wipers. Two inclinometers were included to indicate optically the ship's rolling and pitching on image frames.

46-2241
Sea spray icing rates. I. Intermittent sea spray.
Itagaki, K., MP 3018, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B2/3/1-B2/3/7, 3 refs.
Sea spray, Ship icing, Icing rate, Computer programs.
The icing rate by intermittent sea spray was studied using a computer model based on heat removal and water supply balanced with heat supply and water drainage. Three icing regimes, water supply controlled, mixed and melting, were identified. The maximum icing rate appeared at the lower side of water supply under the assumed conditions. Excessive water supply tended to reduce icing rate.

46-2242
Sea spray icing rates. II. Continuous sea spray.
Itagaki, K., MP 3019, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B2/4/1-B2/4/8, 9 refs.
Sea spray, Ship icing, Icing rate, Computer programs.
The rate of icing caused by continuous sea spray was examined using a model based on supply and balance of heat and water. The results were compared with on-board ship icing observations. At lower air temperature, the model could predict the rate of icing reasonably well, but at the higher temperatures heat removal by simple convective heat transfer was insufficient.

46-2243
Modelling and measurement of spray ice accretion on offshore structures.
Brown, R.D., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B2/5/1-B2/5/6, 10 refs.
Sea spray, Ice accretion, Icing, Offshore structures, Models.

46-2244
Numerical model of the sea water fusion process.
Szilder, K., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B2/6/1-B2/6/5, 13 refs.
Lozowski, E.P., Forest, T.W.
Sea water freezing, Ice accretion, Ice water interface, Brines, Sea spray, Mathematical models.

46-2245
University of Alberta refrigerated marine icing wind tunnel experiments.
Zakrzewski, W.P., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B2/7/1-B2/7/6, 17 refs.
Lozowski, E.P., Gagnon, R.
Ship icing, Sea spray, Ice forecasting, Icing rate, Wind tunnels, Mathematical models.

46-2246
On the frozen force between snow and ethylene tetrafluoride resin.
Kobayashi, S., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B3/1/1-B3/1/4, 7 refs.
Satow, K.
Snow loads, Ice adhesion, Roofs, Plastics snow friction, Resins, Snow removal.

46-2247
New ice and snow repellent coatings and their applications to railways.
Ohishi, F., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B3/4/1-B3/4/5, 2 refs.
Snow loads, Chemical ice prevention, Protective coatings, Railroad cars, Ice adhesion.

46-2248
Development of new coating with hydrophobicity for prevention from snow accretion on antenna radome.
Murase, H., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B3/5/1-B3/5/6, 5 refs.
Tamura, K., Kogure, H., Nanishi, K.
Chemical ice prevention, Snow removal, Snow loads, Radomes, Polymers.

46-2249
Description of experimental facilities to evaluate commercial de/anti-icing fluids.
Laforte, J.L., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B3/6/1-B3/6/6, 7 refs.
Bouchard, G., Louchez, P.
Aircraft icing, Chemical ice prevention, Ice removal.

46-2250
Possible effects of contaminated ice on insulator strength.
Fikke, S.M., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B4/2/1-B4/2/4, 11 refs.
Ice electrical properties, Power line icing, Electrical insulation, Impurities, Electrical resistivity.

46-2251
Investigation of switching impulse flashover voltage performance of UHV class tension insulator assembly covered with snow.
Yasui, M., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B4/5/1-B4/5/5, 3 refs.
Power line icing, Electrical insulation, Snow electrical properties.

46-2252
Investigation of AC insulation performance of tension insulator assembly covered with snow.
Iwama, T., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B4/7/1-B4/7/5, 2 refs.
Power line icing, Electrical insulation, Snow electrical properties.

46-2253
Effect of polluted ice and snow accretions on high-voltage transmission line insulators.
Vučković, Z., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p.B4/3/1-B4/3/6, 2 refs.
Plazinić, S., Zdravković, Z., Hrabak-Tumpa, G.
Power line icing, Electrical insulation, Ice electrical properties, Snow electrical properties, Impurities.

46-2254
Effect of DC and AC corona discharges on the accretion of ice on H.V. conductors.
Farzaneh, M., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B4-6, 1-B4-6, 4, 9 refs
Li, Y., Teisseyre, Y.
Power line icing, Ice accretion, Ice electrical properties, Electric equipment, Electric fields

46-2255
AC and DC flashover performance of ice-covered insulators during a de-icing period.
Farzaneh, M., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B4-8, 1-B4-8, 4, 16 refs
Kiernicki, J., Dallaire, M.A.
Power line icing, Ice removal, Ice electrical properties, Electrical insulation, Electrical resistivity

46-2256
Insulation resistance of transmission line insulators depending on the accretion of ice.
Sugawara, N., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B4-9, 1-B4-9, 6, 6 refs
Power line icing, Electrical insulation, Ice electrical properties, Electrical resistivity, Ice accretion

46-2257
Insulation properties of salt-contaminated fog type insulators depending on the growth of icicles.
Sugawara, N., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B4-10, 1-B4-10, 5, 7 refs
Hokari, K., Matsuda, K., Miyamoto, K.
Power line icing, Electrical insulation, Ice electrical properties, Ice accretion, Electrical resistivity

46-2258
Design and application of phase-to-phase spacers for overhead transmission lines in snowy areas.
Asai, S., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B4-11, 1-B4-11, 5, 4 refs
Power line icing, Wind pressure, Ice electrical properties, Vibration, Damping, Countermeasures

46-2259
Analysis of poor television reception caused by snow and its countermeasures.
Nakahara, S., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B4-12, 1-B4-12, 3, 1 ref
Ohnishi, K.
Snow electrical properties, Antennas, Radomes, Countermeasures, Snow accumulation

46-2260
Electromagnetic properties of thermodynamically irreversibly crystallizing water.
Kachurin, L.G., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B4-13, 1-B4-13, 2, 8 refs
Ice electrical properties, Ice crystal growth, Phase transformations, Thermodynamic properties, Electromagnetic properties

46-2261
Phase transitions of water in nature, causing dangerous phenomena.
Kachurin, L.G., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B4-14, 1-B4-14, 3, 11 refs
Belotserkovskii, A.V.
Ice electrical properties, Ice formation, Phase transformations, Thermodynamic properties

46-2262
Some data for the wet snow regime in Bulgaria.
Kristev, L., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B5-1, 1-B5-1, 3.
Wet snow, Snowfall, Icing, Bulgaria.

46-2263
Distribution of new snow density in Japan.
Yamada, Y., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B5-2, 1-B5-2, 7, 18 refs.
Snow density, Snowfall, Statistical analysis, Snow depth, Snow cover distribution, Japan

46-2264
Development and field observation of measuring system for snow accretion on overhead transmission wires.
Ishida, K., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B5-3, 1-B5-3, 6
Power line icing, Snow loads, Measuring instruments, Data processing, Meteorological instruments

46-2265
Observation system of snow accretion on wires in Tohoku Electric Power Co.
Iosaka, S., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B5-4, 1-B5-4, 4, 1 ref
Atsumi, N., Ibuki, S.
Power line icing, Snow loads, Measuring instruments, Meteorological instruments

46-2266
Development of simple observation system for overhead transmission lines.
Nosaka, T., International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B5-5, 1-B5-5, 5
Power line icing, Snow loads, Measuring instruments, Meteorological instruments

46-2267
Experimental studies on characteristics of snow accumulation and accretion on a suspension bridge using reduced- scale outdoor models.
Kaneda, Y., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B5-6, 1-B5-6, 6, 3 refs
Uematsu, T., Yoneta, Y.
Snow loads, Bridges, Snow accumulation, Models, Wind pressure

46-2268
Mechanism of snow accretion growth on conductors in relation to weather conditions in the Kanto Plain.
Kamiyama, T., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B5-7, 1-B5-7, 4, 2 refs
Power line icing, Snow loads, Snow accumulation

46-2269
Observation of snow accretion on conductors at Narude test line.
Sonoi, Y., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B5-8, 1-B5-8, 4, 1 ref
Toyoda, M., Sasaki, J.
Power line icing, Snow loads, Snow accumulation

46-2270
Dry type snow accretion on overhead wires--growing mechanism, meteorological condition under which it occurs and effect on power lines.
Sakamoto, Y., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B5-9, 1-B5-9, 6, 5 refs.
Mizushima, K., Kawanishi, S.
Power line icing, Snow loads, Snow accumulation.

46-2271
Derivation of extreme value loads for wet snow using a numerical model.
Finstad, K.J., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B6-1, 1-B6-1, 5, 8 refs
De Jaegher, K.A., Orde, C.J., Wilson, D.G.
Power line icing, Snow loads, Wet snow, Mathematical models, Wind pressure.

46-2272
Synthesis of field observations and practical results of the 1983-1990 "wet snow" programme of Électricité de France.
Admirat, P., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B6-2, 1-B6-2, 5, 19 refs
Lapeyre, J.L., Dalle, B.
Power line icing, Snow loads, Wet snow, France.

46-2273
Amount of icicles on overhead lines.
Makkonen, L., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B6-3, 1-B6-3, 4, 5 refs
Fujii, Y.
Power line icing, Ice loads, Ice accretion, Ice growth

46-2274
Snow accretion forecasting system (SAFS).
Tanaka, T., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B6-4, 1-B6-4, 6, 1 ref
Power line icing, Snow loads, Snow accumulation, Ice forecasting, Data processing

46-2275
Forecasting wet snow loads on overhead power lines based on information received from meteorological bureau in real time base.
Sakamoto, Y., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B6-5, 1-B6-5, 6, 2 refs
Mizushima, K., Tachizaki, S.
Power line icing, Snow loads, Ice forecasting, Snow accumulation, Data processing

46-2276
Experimental study on countermeasure for snow accretion on power transmission lines.
Yasui, M., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B7-1, 1-B7-1, 6, 7 refs
Oka, T., Mori, I.
Power line icing, Snow loads, Snow accumulation, Countermeasures

46-2277
Improvement of countermeasures for snow accretion.
Asai, S., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B7-2, 1-B7-2, 5, 5 refs
Mayumi, A., Wakahama, G.
Power line icing, Snow loads, Snow accumulation, Countermeasures

46-2278
Snow accretion resistant, self-supporting optical fiber cable.
Suzuki, M., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B7-3, 1-B7-3, 6, 1 ref
Power line icing, Snow loads, Snow accumulation, Ice prevention, Countermeasures, Cables (ropes)

46-2279
Countermeasure for snow accumulation by method to melt snow on the transmission line conductors.
Yamamoto, T., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B7-4, 1-B7-4, 4, 4 refs
Naito, T., Ando, H., Samejima, M.
Power line icing, Snow loads, Artificial melting, Snow melting, Countermeasures, Magnetic properties, Electric equipment

46-2280
Prevention of snow accretion on O.H.L. conductor by fitting self-energizing de-snowing rings.
Fujii, K., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B7-5, 1-B7-5, 4, 1 ref
Power line icing, Snow loads, Artificial melting, Snow melting, Electric equipment, Magnetic properties

46-2281
Efficient heating control system based on snowfall probabilities for a thaw of structures covered with ice and/or snow.
Sugawara, N., et al, International Workshop on Atmospheric Icing of Structures, 5th, Tokyo, Oct. 29-Nov. 1, 1990. IWAIS '90, Tokyo, 1990, p B7-6, 1-B7-6, 4, 4 refs
Road icing, Electric heating, Artificial melting, Snow melting, Road maintenance, Computer applications, Snow removal

46-2282
Theoretical and observational study of the radiative properties of cirrus: results from FIRE 1986.
Stackhouse, P.W., Jr., et al, *Journal of the atmospheric sciences*, Sep. 15, 1991, 48(18), p.2044-2059, 43 refs.
Stephens, G.L.
Cloud physics, Radiation balance, Ice crystals, Radiation absorption, Scattering, Optical properties, Aerial surveys, Analysis (mathematics).

46-2283
Natural convection in porous media—2. Freezing.
Lein, H., et al, *International journal of heat and mass transfer*, Jan. 1992, 35(1), p.187-194, With French, German and Russian summaries. 12 refs.
Tankin, R.S.
Porous materials, Phase transformations, Freezing, Convection, Heat transfer, Isotherms, Freezing front, Liquid solid interfaces.

46-2284
Scanning electron microscopy of quartz grains in supraglacial debris, Adishy Glacier, Caucasus Mountains, USSR.
Mahaney, W.C., et al, *Boreas*, Dec. 1, 1991, 20(4), p.395-404, 27 refs.
Vaikmae, R.A., Vares, K.
Glacier surfaces, Sediment transport, Soil texture, Scanning electron microscopy, Weathering, Soil analysis, Microstructure, Paleoclimatology, USSR, Adishy Glacier.

46-2285
Age and origin of Neoglacial moraines in Jotunheimen, southern Norway: new evidence from weathering-based data.
McCarroll, D., *Boreas*, Sep. 1, 1991, 20(3), p.283-295, 53 refs.
Moraines, Glacial deposits, Periglacial processes, Weathering, Age determination, Glacier oscillation, Pleistocene, Climatic changes, Accuracy, Norway.

46-2286
Mapping depths of seasonal freezing of soils in the northwestern European USSR.
Garagulia, L.S., et al, *Soviet engineering geology*, 1991, No.2, p.46-54, Translated from Inzhenernaia geologiia, 2 refs.
Chesnokova, I.V.
Soil mapping, Soil classification, Soil freezing, Frost penetration, Frost heave, Seasonal freeze thaw, Engineering geology, Temperature variations.

46-2287
Hydrological response of a medium-sized mountainous catchment to climate changes.
Panagoulia, D., *Hydrological sciences journal*, Dec. 1991, 36(6), p.525-547, With French summary. 22 refs.
Watersheds, Climatic changes, Snow hydrology, Runoff, Snowmelt, Simulation, Evapotranspiration, Seasonal variations, Temperature effects.

46-2288
Rain-induced outflow from deep snowpacks in the central Sierra Nevada, California.
Berg, N., et al, *Hydrological sciences journal*, Dec. 1991, 36(6), p.611-629, With French summary. 22 refs.
Osterhuber, R., Bergman, J.
Snow cover stability, Snowmelt, Runoff, Rain, Flood forecasting, Snow hydrology, Ice water interface, Statistical analysis.

46-2289
Cheese offers whey to deice roads.
Pellerin, C., *R & D magazine*, June 1991, 33(7), p.22.
Road icing, Manufacturing, Environmental impact, Bacteria.

46-2290
Scientists best fish in making antifreeze.
Stambler, I., *R & D magazine*, Aug. 1991, 33(9), p.19-20.
Antifreezes, Chemistry, Synthetic materials, Manufacturing.

46-2291
Effect of salts on the thermal properties of pectin solution on freezing and thawing.
Sawayama, S., et al, *Food hydrocolloids*, Aug. 1991, 5(4), p.393-405, 22 refs.
Kawabata, A.
Colloids, Solutions, Freeze thaw cycles, Thermal properties, Temperature measurement, Chemical analysis, Salinity, Hygroscopic water, Agriculture.

46-2292
Some considerations on the element relationship in glacier snow samples.
Simeonov, V., et al, *Toxicological and environmental chemistry*, Nov. 1991, 33(3-4), p.255-259, 2 refs.
Andreev, G.
Glaciers, Snow composition, Sampling, Chemical properties, Statistical analysis, Correlation, Snow impurities, Chemical analysis.

46-2293
Objective use of observed and forecast thickness values to predict precipitation type in North Carolina.
Keeter, K.K., et al, *Weather and forecasting*, Dec. 1991, 6(4), p.456-469, 16 refs.
Cline, J.W.
Precipitation (meteorology), Weather forecasting, Classifications, Snowfall, Atmospheric pressure, Meteorological data, Analysis (mathematics), Nomographs.

46-2294
Comments on "Prediction of vessel icing for near-freezing sea temperatures".
Makkonen, L., et al, *Weather and forecasting*, Dec. 1991, 6(4), p.565-570, Includes reply. 23 refs. For article under discussion see 44-3346.
Brown, R.D., Mitten, P.T., Overland, J.E.
Ship icing, Ice forecasting, Icing rate, Surface temperature, Analysis (mathematics).

46-2295
Solidification of flowing liquid in an asymmetric cooled parallel-plate channel.
Weigand, B., et al, *International communications in heat and mass transfer*, Jan.-Feb. 1992, 19(1), p.17-27, 13 refs.
Beer, H.
Laminar flow, Water flow, Solidification, Ice formation, Ice water interface, Freezing points, Layers, Classifications.

46-2296
Development of correlations for soil thermal conductivity.
Becker, B.R., et al, *International communications in heat and mass transfer*, Jan.-Feb. 1991, 19(1), p.59-68, 14 refs.
Misra, A., Fricke, B.A.
Soil temperature, Thermal conductivity, Soil analysis, Saturation, Frozen ground thermodynamics, Heat transfer, Statistical analysis, Correlation.

46-2297
Water relations of *Pachysandra* leaves during freezing and thawing—evidence for a negative pressure potential alleviating freeze-dehydration stress.
Zhu, J.J., et al, *Plant physiology*, Nov. 1991, 97(3), p.1146-1153, 28 refs.
Beck, E.
Plant physiology, Plant tissues, Frost resistance, Freeze thaw tests, Cold tolerance, Freeze drying, Plants (botany), Thermal analysis, Water pressure.

46-2298
Antarctica and global climatic change.
Harris, C.M., ed, London, Boca Raton, FL, Bellhaven Press, Lewis Publishers, 1991, 198p., For individual papers see 46-2299 through 46-2308 or A-44574, B-44570, B-44571, D-44561, F-44566, F-44569, I-44562 through I-44565, I-44567, I-44572, I-44573 and J-44568.
Stonehouse, B., ed.
Meetings, Climatic changes, Sea ice, Bibliographies, Ecology.
The United Kingdom and New Zealand 1990 Symposium on Antarctica and Global Climatic Change was held in Selwyn College, Cambridge on June 26 and 27, 1990. The symposium specifically addressed an issue of great current interest—the importance of Antarctica and its surrounding ocean in studies of global climatic change. The symposium was divided into six sessions, each with a main speaker and a commentator, followed by discussion from the floor. The final discussion was followed by an historical overview. In this volume the papers and commentaries (which aim to criticize and extend points made in the main paper, but are briefer discussions) are presented under three main headings: Part 1, Current state of knowledge; Part 2, Atmosphere, ice and ocean; and Part 3, Ecology and management responses. The volume ends with a guide to recent literature on Antarctica and global climatic change.

46-2299
Antarctica and global climate change: review of prominent issues.
Ellis, J., Antarctica and global climatic change, edited by C.M. Harris and B. Stonehouse, London, Boca Raton, FL, Bellhaven Press, Lewis Publishers, 1991, p.11-20, 8 refs.
Climatic changes, Ice cores, Ozone, Sea level, Models.
Both New Zealand and Britain have strong research programs in atmospheric and climatic change. Being in temperate climates both could be affected appreciably by global warming. New Zealand has already had ozone-depleted air pass over the South Island. Antarctic research has encouraged interdisciplinary science studies and has provided a model in international cooperation. There is a major emphasis at present on reassessing atmospheric changes past and present due to present concerns about changes in climate and sea levels, ultraviolet (UV) radiation levels and general atmospheric pollution. The Antarctic is a store of past knowledge on world climates and atmospheric changes. The ice, on average 2000 m thick, carries within it the climatic history of the last 200,000 years. This is accessible through modern geochemical and biological techniques applied to ice cores and to glacial sediments. Specific topics being addressed include observed and interpreted climatic changes; changes in atmospheric gas content; construction of models; ozone concentrations; and changes in the antarctic ice sheet as preserved in cores.

46-2300
Global climate models and antarctic climatic change.
Cattle, H., Antarctica and global climatic change, edited by C.M. Harris and B. Stonehouse, London, Boca Raton, FL, Bellhaven Press, Lewis Publishers, 1991, p.21-34, 31 refs.
Atmospheric circulation, Climatic changes, Carbon dioxide, Models.
Antarctica plays a significant role for global climate from a number of points of view. It is a major component of the land-sea contrasts between the Northern and Southern Hemispheres which themselves are important for the different characteristics of the flow in the two halves of the globe in both the atmosphere and oceans. As a result, the large-scale mean atmospheric flow in the Northern Hemisphere tends to be more wavelike in character than that of the Southern Hemisphere where the flow is more highly zonal. The antarctic continent represents the major high-altitude topographic heat sink for the atmosphere. Indeed, the continental dominance of the Southern Hemisphere polar region contrasts markedly with the mediterranean aspect which prevails in the Arctic. Several investigators have constructed various models to quantify the hemispheric contrasts in circulation and thermal regimes, and these models are reviewed. The increasing influence on climate changes of rising global concentrations of natural and man-made CO2 is discussed and assessed.

46-2301
Antarctica and global climatic change: a geological perspective.
Barrett, P.J., Antarctica and global climatic change, edited by C.M. Harris and B. Stonehouse, London, Boca Raton, FL, Bellhaven Press, Lewis Publishers, 1991, p.35-50, 44 refs.
Paleoclimatology, Climatic changes, Glacial geology, Sea level.
In global climate studies, most weight has been placed on the development of mathematical models for the behavior of the atmosphere and oceans to predict future changes in climate, but their power is still limited by their sensitivity to initial conditions. An alternative approach is to study past changes in climate, the subject of this review. The sedimentary strata of Antarctica contain a record of the past climate of the continent. Consideration is limited to the last 400 million years, which is better represented and dated than earlier times. For most of that period the antarctic continent occupied a polar position and thus has been in the most favored position of all continents to accommodate and provide evidence of continental glaciation. Particular emphasis is on those aspects of the record in antarctic strata that can offer some perspective on likely changes in global climate and sea level arising from human activities. This geological perspective should be useful for two reasons. First, human influence on planetary processes has reached a geological magnitude. Second, a comparison of data from antarctic ice cores, deep sea cores and marine terraces shows a close association between CO2 levels, temperature, ice volume and sea level over the last glacial-interglacial cycle.

46-2302
Antarctic ice studies in global climatic change: a comment.
Morris, E.M., Antarctica and global climatic change, edited by C.M. Harris and B. Stonehouse, London, Boca Raton, FL, Bellhaven Press, Lewis Publishers, 1991, p.51-62, 10 refs.
Climatic changes, Ice shelves, Carbon dioxide, Models.
In developing a linked atmosphere-ice-ocean climatic change model it is necessary to test the various components against different time scales. This type model is full of complexities requiring examinations of the models for agreement with observations. Included are sample plots of temperature which demonstrate the necessity for this check. Some of the components of the model are ice temperature, change in precipitation rate, carbon dioxide levels, water circulation beneath ice shelves, and the ice shelves themselves as warming indicators. The author includes pertinent data from antarctic research.

46-2303
Atmosphere-ice-ocean interactions in the Antarctic.
Wadhams, P., Antarctica and global climatic change, edited by C.M. Harris and B. Stonehouse, London, Boca Raton, FL, Bellhaven Press, Lewis Publishers, 1991, p.65-81, 24 refs.
Sea ice, Ice structure, Climatic changes.
The seasonal variability of the sea ice cover in the Antarctic is one of the most climatically important features of the Southern Hemisphere. The variation is from 4 million sq km in summer to 20 million sq km in winter, and the most recent examination

of the data suggests that the seasonally corrected extent has varied about a constant level since 1981. The main features of the seasonal cycle are shown for a typical recent year. The presence of a sea ice cover has an enormous effect on the exchanges of heat, moisture and momentum between ocean and atmosphere, and the motion of the sea ice modifies water masses both in the region of generation and in the region of melt which may be hundreds or thousands of kilometers away. Since the antarctic sea ice and its huge seasonal cycle are of central importance to the climate and energy budgets of the southern ocean, it is vital to understand the mechanisms leading to ice formation, transport and melt. Differences in structure and formation between arctic and antarctic ice are given and the terms first-year and multi-year ice, snow loading, and pressure ridging are defined. Other facets of sea ice are briefly described: coastal polynyas, interactions between climatic change and antarctic sea ice, remote sensing of antarctic sea ice, bottom water production, and sea ice biology.

46-2304

Atmosphere-ice-ocean: do we really understand what is going on.

Squire, V.A., Antarctica and global climatic change, edited by C.M. Harris and B. Stonehouse, London, Boca Raton, FL, Bellhaven Press, Lewis Publishers, 1991, p.82-89, 12 refs.

Sea ice, Climatic changes.

The author argues that all the data available is insufficient to make a reliable prediction as to how the antarctic sea ice will react to the climate warming which is apparently occurring. The data gathered thus far point only to a very complex relationship in the air-ice-ocean system and do little to suggest how to understand it. Topological applications may be able to provide clues at some later time.

46-2305

Response of the antarctic ice sheet to climatic change.

Drewry, D.J., Antarctica and global climatic change, edited by C.M. Harris and B. Stonehouse, London, Boca Raton, FL, Bellhaven Press, Lewis Publishers, 1991, p.90-106, 41 refs.

Sea level, Precipitation (meteorology), Climatic changes, Ice sheets, Mass balance.

A central issue in sea level predictions is to determine better the sign and magnitude of antarctic ice volume changes and their time-scales. In the short term the increase in precipitation over the ice sheet will be the principal response to a warming climate, and this effect is already observed. On the basis that the net accumulation over Antarctica is of the order of 2200 Gt yr, a conservative increase in precipitation of 0.5% per year, as suggested from the Antarctic Peninsula and the results from East Antarctica, would lower sea level by approximately 0.03 mm/yr. Alternatively, the same lowering could be expressed as resulting from an average atmospheric temperature change over Antarctica of +2-3 C per decade. In the longer term, over the next 500 years or more, ice flow will adjust to enhanced ocean and atmospheric warming, with an increase in the discharge of ice stored on the continent to the sea. Initially this is predicted to occur through a thinning and retreat of ice shelves and ice streams, with possible consequent drawdown of ice in the interior of West Antarctica. Although rates are not known and available glaciological models are still primitive, some studies show that sea level rise could be of the order of 2 mm/yr once this process has been initiated.

46-2306

Stepped response of ice sheets to climatic change.

Sugden, D.E., Antarctica and global climatic change, edited by C.M. Harris and B. Stonehouse, London, Boca Raton, FL, Bellhaven Press, Lewis Publishers, 1991, p.107-114, 25 refs.

Ice sheets, Ablation, Climatic changes, Topographic effects.

The purpose of this paper is to suggest that topography brings non-linearities into the process of ice sheet growth and decay. It introduces thresholds of stability and instability which cause a stepped response to climatic change. This type of behavior has long been postulated on the basis of field evidence, and is readily modelled when detailed topography is included as a boundary condition. This conclusion is important when predicting the response of the antarctic ice sheet to climatic change. It implies that any change in ice extent or its effect on global sea level may not be regular but stepped. This is particularly possible in the case of the west antarctic ice sheet, a marine ice sheet which is prone to calving instabilities. It also implies that it is necessary to introduce the unique topography beneath the ice sheet in a modelling strategy designed to identify any thresholds of instability. (Auth.)

46-2307

Strategies for mitigating impacts of climatic change: the science and the challenge.

Hickman, J.S., Antarctica and global climatic change, edited by C.M. Harris and B. Stonehouse, London, Boca Raton, FL, Bellhaven Press, Lewis Publishers, 1991, p.169-176, 2 refs.

Climatic changes, Atmospheric composition, Economic development.

Some of the historic milestones in climate research are pointed out: the 1st and 2nd Polar Years, the IGY, detection and measurement of atmospheric CO2, World Weather Watch (WWW), Global Atmospheric Research Programme (GARP), World Climate Research Programme, and the Intergovernmental Panel on Climate Research (IPCC), having a knowledge assembling and assessment function. The certain knowledge can be summed up in two simple statements. One is that the atmosphere acts as a blanket that keeps the Earth's surface warmer than it would be if there were no atmosphere containing radiatively absorbing gases. The effectiveness of the blanket is determined by the concentration in the atmosphere of radiatively absorbing gases--popularly called the greenhouse gases. The other statement is that human activities are increasing the concentration of greenhouse gases in the atmosphere at an apparently unprecedented rate. Possible response strategies are of two main types: limitation of net emissions of greenhouse gases, and adaptation to climatic change. Comments on the first option are made, and the ambivalence is noted of developing nations' need for economic stimulation which would entail producing more greenhouse gases and the industrial nations' need to reduce these gases to de-pollute the atmosphere.

46-2308

Antarctica and global climatic change: a guide to recent literature.

Meadows, J., comp., Antarctica and global climatic change, edited by C.M. Harris and B. Stonehouse, London, Boca Raton, FL, Bellhaven Press, Lewis Publishers, 1991, p.177-191.

Harris, C.M.

Bibliographies.

This guide is intended to provide a broad introduction to the recent literature on the role of Antarctica in global climatic change. The majority of references are of a technical nature, but literature suitable for the non-specialist and some popular-level material are included. The citations are classed into these categories: General; Palaeoclimate; Sediment cores, ice cores; Glaciology, ice sheets, ice shelves; Sea ice, sea level, oceanography; Atmospheric sciences, ozone depletion, carbon dioxide; Biology, ecology; and Response strategies, management.

46-2309

1991-92 Australian Antarctic Research Program. Antarctic Treaty exchange information. Supplement A to particulars for Australian National Antarctic Research Expeditions.

Australia. Antarctic Division, Kingston, Tasmania, 1991, 293p., Refs. passim. For selected papers see B-45579 through B-45593, E-45576, E-45577, H-45578, J-45594 through J-45596 and K-45597.

Research projects, Ice, Polar regions.

Research projects are described, proposed to be conducted by ANARE during the summer of 1991-92 and winter of 1992, in areas of biology, chemistry, earth sciences, logistics, environmental studies, glaciology, history, human biology, life sciences, mapping, meteorology, oceanography, physics and psychology. Included are indexes by author and by area, an ASAC Grants scheme and a list of names and addresses of principal investigators.

46-2310

Velocity of dislocations in crystals of HCl-doped ice.

Shearwood, C., et al, *Philosophical magazine A*, Jan. 1992, 65(1), p.85-89, 16 refs.

Whitworth, R.W.

Doped ice, X ray analysis, Hydrogen bonds, Ice physics, Orientation, Ice crystal structure, Dielectric properties, Ice relaxation, Low temperature tests.

46-2311

First Landsat multi-spectral scanner images of the Canadian Arctic north of 80 deg N.

Jeffries, M.O., et al, *Polar record*, Jan. 1992, 28(164), p.1-6, 10 refs.

Reynolds, G.J., Miller, J.M.

LANDSAT, Arctic landscapes, Glacier surfaces, Spaceborne photography, Imaging, Glaciology, Geomorphology.

46-2312

Supercooling and freezing in the main stem of Valencia orange trees.

Yelenosky, G., *Cryobiology*, Aug. 1991, 28(4), p.382-390, 28 refs.

Cryobiology, Plant tissues, Frost resistance, Supercooling, Ice formation, Ice nuclei, Damage, Temperature effects.

46-2313

27-28 October 1986 FIRE cirrus case study: retrieval of cloud particle sizes and optical depths from comparative analyses of aircraft and satellite-based infrared measurements.

Hammer, P.D., et al, *Monthly weather review*, July 1991, 119(7), p.1673-1692, 37 refs.

Valero, F.P.J., Kinne, S.

Cloud physics, Radiometry, Aerial surveys, Ice crystals, Ice crystal optics, Radiance, LANDSAT, particle size distribution, Infrared reconnaissance.

46-2314

Deicing without defoliating.

Fritzsche, C., *American city & county*, Jan. 1992, 107(1), p.40-42,44.

Road icing, Ice removal, Salting, Environmental impact, Vegetation factors, Damage, Countermeasures.

46-2315

Heavy metals and macroelements in the tundra of southern Spitsbergen: the effect of little auk *Alle alle* (L.) colonies.

Godzik, B., *Polar research*, Dec. 1991, 9(2), p.121-131, 20 refs.

Tundra, Vegetation, Metals, Chemical analysis.

46-2316

Heavy metals and sulphur in mosses from southern Spitsbergen.

Grodzińska, K., et al, *Polar research*, Dec. 1991, 9(2), p.133-140, 31 refs.

Godzik, B.

Metals, Mosses, Chemical analysis.

46-2317

Role of weathering and pedological processes for the development of sorted circles on Kvadehuksletta, Svalbard—a short report.

Etzelmüller, B., et al, *Polar research*, Dec. 1991, 9(2), p.181-191, 36 refs.

Sollid, J.L.

Patterned ground, Geocryology, Weathering.

46-2319

Role of the West Spitsbergen Current in the formation of ice edge position.

Makshtas, A.P., et al, *Polar research*, Dec. 1991, 9(2), p.207-210, 10 refs.

Podgornyi, I.

Ocean currents, Sea ice, Ice edge.

46-2320

Some notes on glacial geomorphology in the inner part of St. Jonsfjorden, Svalbard.

Kverndal, A.I., *Polar research*, Dec. 1991, 9(2), p.215-217, 5 refs.

Glacial geology, Glaciers.

46-2321

In Antarctica, scientists go with the floe.

Stroh, M., *Science news*, Feb. 22, 1992, 141(8), p.119.

Sea ice, Drift stations, Research projects, Antarctica—Weddell Sea.

This brief report announces the start of a joint U.S.-Russian effort to study the long-neglected northwestern sector of the Weddell Sea. A station has been established on an ice floe measuring 2 mi x 1 mi x 7 ft to study heat exchange between the ocean and the atmosphere and how the intervening ice influences that exchange. The scientists also hope to learn more about the formation and dispersal of antarctic bottom water, a significant factor affecting global climate.

46-2322

Vapor diffusional growth of free-falling snow crystals between -3 and -23 C.

Takahashi, T., et al, *Meteorological Society of Japan. Journal*, Jan. 1991, 69(1), p.15-30, With Japanese summary, 27 refs.

Endoh, T., Wakahama, G., Fukuta, N.

Falling snow, Snow crystal growth, Snow crystal structure, Vapor diffusion, Snow air interface, Temperature effects, Cloud chambers, Velocity.

46-2323

Two different stages in polar stratospheric clouds events: lidar backscatter of particulate matter and temperature in antarctic stratosphere.

Iwasaka, Y., et al, *Meteorological Society of Japan. Journal*, Jan. 1991, 69(1), p.71-81, With Japanese summary, 37 refs.

Hayashi, M.

Polar atmospheres, Atmospheric composition, Cloud physics, Aerosols, Heterogeneous nucleation, Lidar, Backscattering, Chemical analysis, Ozone, Stratosphere, Antarctica—Showa Station.

Two different types of aerosols were observed during Polar Stratospheric Clouds (PSCs) events at Showa Station using a lidar. Thermodynamical discussion on particle forms in the antarctic winter stratosphere suggests that these two types were possibly nitric acid trihydrated (NAT) crystal and ice crystal, and in the early stage of a PSC event most of the particles are NAT; in the fully developed stage the major component is ice crystals. Early stage PSCs sometimes contained an ice crystal particle layer, possibly due to water vapor input from the troposphere; the ice particles appear without nucleation on NAT particles. The region where PSCs particles can actively form expanded to the tropopause in the fully developed stage of PSCs. Particle descent from the stratosphere to the troposphere is certainly active under such conditions, hence this motion is an important sink of stratospheric particulate matter and related gases. Denitrification of the stratosphere due to these factors will be an important process in influencing antarctic ozone. (Auth. mod.)

46-2324
Observation of the liquid water content of melting snowflakes with a new instrument.
Sasyo, Y., et al, *Meteorological Society of Japan. Journal*, Jan. 1991, 69(1), p.83-90, With Japanese summary. 6 refs.
Mori, T., Onozaki, O., Saito, T.
Snowflakes, Falling snow, Snow water content, Measuring instruments, Snow melting, Snow samplers, Design, Snow pellets.

46-2325
New assaults seen on Earth's ozone shield.
Kerr, R., *Science*, Feb. 14, 1992, 255(5046), p.797-798.
Ozone, Atmospheric composition, Chemical analysis.

46-2326
Northern hydrology: selected perspectives.
Prowse, T.D., ed, *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, 532p., Proceedings of the Northern Hydrology Symposium, Saskatoon, Saskatchewan, July 10-12, 1990. Refs. passim. For selected papers see 46-2327 through 46-2364.
Ommanney, C.S.L., ed.
Permafrost hydrology, Glacial hydrology, Snowmelt, Meltwater, Water chemistry, Runoff forecasting, River ice, Water balance, Subglacial drainage, Ground water.

46-2327
Case study of a grounded jam; Restigouche River, New Brunswick.
Beltaos, S., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.1-15, 14 refs.
Burrell, B.C.
Ice jams, Grounded ice, River ice, River flow, Mathematical models.

46-2328
Water balance and geochemistry studies in a tundra watershed, District of Keewatin, Northwest Territories.
Bursey, G.G., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.17-31, 29 refs.
Edwards, T.W.D., Frape, S.K.
Tundra, Permafrost hydrology, Water balance, Geochemistry, Water chemistry, Watersheds, Ground water.

46-2329
River icing mounds: a winter water source on the eastern North Slope of Alaska.
Chacho, E.F., Jr., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, MP 3020, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.33-45, 16 refs.
Collins, C.M., Delaney, A.J., Arcone, S.A.
Naleds, Frost mounds, Water supply, River ice, Ice cover thickness, Ice surveys, Unfrozen water content, Water reserves, Airborne radar, United States—Alaska—North Slope.
The icing mounds on two eastern North Slope rivers, the Sadlerochit and Hulahula, were investigated in Apr. 1989. Approximately 100 mounds were surveyed on each river, representing about half the total number observed. The surveys were conducted using an airborne short-pulse radar system, from which water-bearing mounds could be estimated. The distribution of icing mounds was measured on a 50- to 70 km reach of each river, extending from the coast to the Sadlerochit Mountains. The ice thickness of water-bearing mounds was generally greater than 1.5 m, while icing mounds with an ice thickness of less than 1.3 m were generally dry. All mounds exceeding a height of 1.25 m over the surrounding ice surface were found to contain water.

46-2330
Geochemical evolution of water in a continental high boreal wetland basin: preliminary results.
Craig, D., *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.47-55, 6 refs.
Wetlands, Permafrost hydrology, Water chemistry, Geochemistry, Active layer, Runoff, Hydrogeochemistry.

46-2331
Physical model of ice overthrust during the break-up of intact river-ice covers.
Demuth, M.N., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.57-73, 22 refs.
Prowse, T.D.
River ice, Ice breakup, Ice cover strength, Ice override, Ice deformation, Ice loads, Flexural strength, Ice models, Mathematical models.

46-2332
Seasonal changes in the hydrochemistry of land drainage: Colour Lake catchment, Axel Heiberg Island, N.W.T.
English, M., et al *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.75-88, 10 refs.
Lake water, Water chemistry, Permafrost hydrology, Drainage, Seasonal variations, Snowmelt, Active layer, Runoff, Canada—Northwest Territories—Axel Heiberg Island.

46-2333
Shape, length and flow conditions of conduits at South Cascade Glacier, Washington State, U.S.A.
Fountain, A.G., *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.89-104, 22 refs.
Glacial hydrology, Subglacial drainage, Subglacial observations, Water flow, Meltwater, Analysis (mathematics), United States—Washington—South Cascade Glacier.

46-2334
CO2-rich ground waters of the Flat River valley, N.W.T.
Hamilton, S.M., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.105-119, 25 refs.
Michel, F.A., Jefferson, C.W.
Ground water, Springs (water), Water chemistry, Carbon dioxide, Canada—Northwest Territories.

46-2335
Regional snow ablation in the Alaskan Arctic.
Hinzman, L.D., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.121-139, 32 refs.
Kane, D.L., Gieck, R.E.
Snow melting, Snow cover distribution, Seasonal ablation, Snow hydrology, Snow evaporation, Snow heat flux, Snowmelt, Snow surveys, United States—Alaska—North Slope.

46-2336
Regionalization of low flows in Yukon Territory.
Janowicz, J.R., *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.141-150, 5 refs.
Stream flow, Permafrost hydrology, Drainage, Statistical analysis, Runoff forecasting, Canada—Yukon Territory.

46-2337
Discharge regimes of a glacierized basin, Slims River, Yukon.
Johnson, P.G., *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.151-164, 23 refs.
Glacial rivers, Glacial hydrology, Meltwater, Subglacial drainage, Snowmelt, Suspended sediments, River flow, Canada—Yukon Territory.

46-2338
Pulses in glacier discharge: indicators of the internal drainage system of glaciers.
Johnson, P.G., *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.165-175, 13 refs.
Glacial hydrology, Subglacial drainage, Meltwater, Floods, Canada—Yukon Territory.

46-2339
Drainage of an ice-dammed lake, Kaskawulsh Glacier basin, Yukon.
Kasper, J.N., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.177-188, 18 refs.
Johnson, P.G.
Glacial lakes, Icebound lakes, Subglacial drainage, Ice dams, Glacial hydrology, Canada—Yukon Territory.

46-2340
On areal distribution of snowcover in a mountainous area.
Killingtveit, Å., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.189-203, 11 refs.
Sand, K.
Snow cover distribution, Snow surveys, Snow depth, Snow hydrology, Snow water equivalent, Mountains, Runoff forecasting, Norway.

46-2341
Hydrogeochemical aspects of two selected sites in a fringe zone of discontinuous permafrost.
Kwong, Y.T.J., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.205-218, 15 refs.
Craig, D., Griffin, M.
Permafrost distribution, Discontinuous permafrost, Hydrogeochemistry, Permafrost hydrology, Ground water, Water chemistry, Canada—Alberta.

46-2342
Ice-cover growth and freeze-out of solutes in a Mackenzie Delta lake.
Lesack, L.F.W., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.219-236, 29 refs.
Marsh, P., Hecky, R.E.
Lake ice, Ice cover effect, Lake water, Water chemistry, Ice water interface, Deltas, Floodplains, Flooding, Ice growth, Canada—Northwest Territories—Mackenzie River Delta.

46-2343
Hydrological processes in a small catchment containing a perennial snowbank, Melville Island, N.W.T.
Lewkowicz, A.G., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.237-251, 21 refs.
Young, K.L.
Permafrost hydrology, Snow cover effect, Snow hydrology, Snowdrifts, Drainage, Snowmelt, Water balance.

46-2344
On modelling surface meltwater discharge from arctic and alpine glaciers.
Munro, D.S., *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.253-262, 24 refs.
Glacial hydrology, Glacier melting, Meltwater, Glacier surfaces, Glacier mass balance, Mathematical models, Glacier heat balance.

46-2345
High arctic occurrence of seasonal frost mounds.
Pollard, W.H., *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.263-275, 18 refs.
Permafrost hydrology, Frost mounds, Seasonal freeze thaw, Naleds, Springs, Suprapermafrost groundwater, Canada—Northwest Territories—Axel Heiberg Island.

46-2346
Relationships between snow chemistry and blowing snow: initial findings.
Pomeroy, J.W., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium*, 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.277-292, 24 refs.
Davies, T.D., Tranter, M.
Snow composition, Snow impurities, Blowing snow, Pollution, Snow evaporation, Wind factors.

46-2347
Peatlands of the Lake Melville coastal plain, Labrador.
Price, J.S., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.293-302, 16 refs.
Maloney, D.A., Downey, F.G.
Peat, Wetlands, Hydrology, Water balance, Canada—Labrador.

46-2348
Constraints on the origin of acidity in Colour Lake, Axel Heiberg Island (79 deg 25 min N).
Schiff, S., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.303-318, 19 refs.
Lake water, Water chemistry, Suprapermafrost ground water, Snowmelt, Lake ice, Global warming, Canada—Northwest Territories Axel Heiberg Island.

46-2349
Longitudinal dispersion in the ice-covered Athabasca River.
Van Der Vinne, G., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.319-331, 9 refs.
Andres, D.
River ice, River flow, Ice cover effect, Water pollution, Dispersions, Canada—Alberta—Athabasca River.

46-2350
Economic impact of river ice jams in Canada.
Van Der Vinne, G., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.333-352, 5 refs.
Prowse, T.D., Andres, D.
Ice jams, Economic analysis, River ice, Damage, Canada.

46-2351
Estimation of mass-balance and run-off component of Urumqi Glacier No.1 from water-balance analysis.
Yang, Z.N., *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.353-361, 6 refs.
Glacier surveys, Glacier mass balance, Meltwater, Water balance, Glacial hydrology, Runoff, China—Tian Shan.

46-2352
Interactive modelling of cold regions watersheds with SSARR.
Cassell, E.A., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, MP 3021, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.363-377, 18 refs.
Pangburn, T.
Watersheds, Snowmelt, Stream flow, Runoff forecasting, Models, Hydrology, Data processing.
Until recently, capabilities of hydrological models to account for the effect of cold regions processes on run-off forecasting have been limited by the difficulty of data acquisition and the absence of modelling environments that have convenient process-level based interactive features. The work reviewed here describes results from research on modifications that have enhanced the Streamflow Synthesis and Reservoir Regulation (SSARR) model's ability to account for cold regions effects. These investigations have led to the development of a systems dynamic model version of SSARR. This new model, SSARR-DS, provides an extremely user-friendly environment that offers convenient data input and constructive interactive features.

46-2353
Estimates of evaporation in the Yukon and Northwest Territories.
Haas, J., *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.379-392, 16 refs.
River basins, Water balance, Evapotranspiration, Water storage, Runoff forecasting, Global warming, Models, Data processing, Canada—Yukon Territory, Canada—Northwest Territories.

46-2354
Basin water-storage model to forecast Columbia River discharge.
Tangborn, W.V., *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.393-404, 7 refs.
River basins, Water storage, Runoff forecasting, Snow water content, Models, River flow, United States—Columbia River.

46-2355
Preliminary findings from experiments on frazil and anchor ice in a circular flume.
Tsang, G., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.405-418, 8 refs.
Trapp, B.
Frazil ice, Bottom ice, Ice formation, Ice models, Laboratory techniques.

46-2356
On computer simulation of ice motion in rivers.
Vinogradov, O.G., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.419-426, 9 refs.
Springer, A., Wierzba, P.
River ice, Ice jams, Ice mechanics, Computerized simulation, River flow.

46-2357
Transformation of heavy metals under tidal flows in the Severnaya Dvina estuary.
Brekhovskikh, V.F., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.427-436, 9 refs.
Maliutin, A.N., Mordasov, M.A.
Estuaries, Water pollution, Water chemistry, Wastes, Bottom sediment, Suspended sediments, USSR—White Sea.

46-2358
Northern river: BOD-DO model.
Brekhovskikh, V.F., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.437-442, 6 refs.
Vol'pian, G.V.
Water pollution, Water chemistry, Rivers, Ice cover effect, Oxygen.

46-2359
Water storage in alpine glaciers.
Brugman, M.M., *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.443-444, Extended abstract. 4 refs.
Water storage, Glacial hydrology, Mountain glaciers.

46-2360
Snowmelt infiltration into frozen soil at sites in the discontinuous permafrost zone near Mayo, Yukon Territory.
Burn, C.R., *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.445-459, 20 refs.
Permafrost hydrology, Snowmelt, Seepage, Discontinuous permafrost, Snow cover effect, Permafrost thermal properties, Frozen ground temperature, Canada—Yukon Territory.

46-2361
Yukon and Northwest Territories ground-water data base.
Hardisty, P., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.465-482, 5 refs.
Schilder, V., Dabrowski, T., Wells, J.
Ground water, Water supply, Permafrost hydrology, Data processing, Canada—Northwest Territories, Canada—Yukon Territory.

46-2362
Some aspects of glacier hydrology in China.
Hu, X.G., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.483-498, 25 refs.
Yang, Z.N.
Glacial hydrology, Meltwater, Glacier surveys, Runoff forecasting, Mathematical models, China.

46-2363
Modelled estimates of changes in the water balance of forested northern river basins.
Motovilov, IU.G., et al, *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.499-513, 6 refs.
Nazarov, N.A.
River basins, Water balance, Snowmelt, Forest land, Runoff forecasting, Mathematical models.

46-2364
Study of surface water quality in the northern region subject to pollution.
Shammasov, A.N., *Environment Canada. National Hydrology Research Institute. NHRI symposium,* 1991, No.6, Northern hydrology: selected perspectives. Edited by T.D. Prowse and C.S.L. Ommanney, p.515-520, 2 refs.
Water pollution, Water chemistry, Water treatment.

46-2365
Foundations in cold regions.
Phukan, A., Foundation engineering handbook, 2nd edition. Edited by H.Y. Fang, New York, Van Nostrand Reinhold, 1991, p.735-749, 25 refs.
Foundations, Frozen ground strength, Frozen ground thermodynamics, Cold weather construction, Analysis (mathematics).

46-2366
Arctic ecosystems in a changing climate; an ecophysiological perspective.
Chapin, F.S., III, ed, San Diego, CA, Academic Press, 1992, 469p., Refs. passim. For selected papers see 46-2367 through 46-2385.
DLC QK474.A48 1991
Ecosystems, Plants (botany), Climatic changes, Plant physiology, Tundra, Global warming, Carbon dioxide, Models, Nutrient cycle, Photosynthesis, Taiga, Mosses, Lichens, Global warming.

46-2367
Arctic climate: potential for change under global warming.
Maxwell, B., Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.11-34, Refs. p.31-34.
Climate, Climatic changes, Global warming, Global change, Ecosystems, Carbon dioxide, Models, Continuous permafrost.

46-2368
Arctic hydrology and climate change.
Kane, D.L., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.35-57, Refs. p.55-57.
Hinzman, L.D., Woo, M.K., Everett, K.R.
Runoff, Watersheds, Hydrology, Water balance, Models, Climatic changes, Global warming, Snowmelt, Active layer.

46-2369
Circumpolar arctic vegetation.
Bliss, L.C., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.59-89, Refs. p.86-89.
Matveeva, N.V.
Vegetation, Tundra, Forest tundra, Deserts, Swamps, Climatic changes, Vegetation patterns, Mosses, Lichens.

46-2370
Phytogeographic and evolutionary potential of the arctic flora and vegetation in a changing climate.
Billings, W.D., Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.91-109, Refs. p.106-109.
Plants (botany), Tundra, Vegetation, Peat.

46-2371
Plant succession, competition, and the physiological constraints of species in the Arctic.
Bliss, L.C., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.111-136, Refs. p.133-136.
Peterson, K.M.
Plants (botany), Plant physiology, Tundra, Ecosystems.

46-2372
Effects of global change on the carbon balance of arctic plants and ecosystems.
Oechel, W.C., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.139-168, Refs. p.164-168.
Billings, W.D.
Ecosystems, Tundra, Global change, Taiga, Carbon dioxide, Plants (botany), Forest ecosystems, Photosynthesis, Temperature effects.

46-2373
Photosynthesis, respiration, and growth of plants in the Soviet Arctic.
Semikhatova, O.A., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.169-192, Refs. p.190-192.
Gerasimenko, T.V., Ivanova, T.I.
Plants (botany), Photosynthesis, Growth, Carbon dioxide, Plant physiology, Temperature effects.

46-2374
Phenology, resource allocation, and growth of arctic vascular plants.
Shaver, G.R., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.193-211, Refs. p.209-211.
Kummerow, J.
Plants (botany), Growth, Tundra, Biomass, Plant tissues, Plant physiology.

46-2375
Ecosystem role of poikilohydric tundra plants.
Tenhunen, J.D., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.213-237, Refs. p.234-237.
Biomass, Ecosystems, Tundra, Plant physiology, Plants (botany), Microclimatology, Photosynthesis, Carbon dioxide, Mosses, Lichens.

46-2376
Arctic tree line in a changing climate.
Sveinbjörnsson, B., Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.239-256, Refs. p.253-256.
Trees (plants), Carbon dioxide, Growth, Plant physiology, Taiga, Tundra, Forest ecosystems, Nutrient cycle, Plant tissues.

46-2377
Water relations of arctic vascular plants.
Oberbauer, S.F., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.259-279, Refs. p.275-279.
Dawson, T.E.
Plants (botany), Plant physiology, Ecosystems, Climatic changes, Global change, Soil water, Carbon dioxide, Cryogenic soils.

46-2378
Microbial processes and plant nutrient availability in arctic soils.
Nadelhoffer, K.J., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.281-300, Refs. p.295-300.
Giblin, A.E., Shaver, G.R., Linkins, A.E.
Cryogenic soils, Nutrient cycle, Tundra, Ecosystems, Soil microbiology, Plants (botany).

46-2379
Nitrogen fixation in arctic plant communities.
Chapin, D.M., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.301-319, Refs. p.317-319.
Bledsoe, C.S.
Ecosystems, Climatic changes, Nutrient cycle, Soil composition, Carbon dioxide, Bacteria, Plants (botany).

46-2380
Nutrient absorption and accumulation in arctic plants.
Kielland, K., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.321-335, Refs. p.333-335.
Chapin, F.S., III.
Plants (botany), Nutrient cycle, Tundra, Growth, Ecosystems, Climatic changes, Plant physiology.

46-2381
Nutrient use and nutrient cycling in northern ecosystems.
Berendse, F., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.337-356, Refs. p.353-356.
Jonasson, S.
Nutrient cycle, Ecosystems, Tundra, Plants (botany), Growth, Absorption, Plant physiology, Carbon dioxide, Biomass.

46-2382
Response of tundra plant populations to climatic change.
McGraw, J.B., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.359-376, Refs. p.374-376.
Fetcher, N.
Plants (botany), Tundra, Ecosystems, Climatic changes, Plant ecology.

46-2383
Controls over secondary metabolite production by arctic woody plants.
Bryant, J.P., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.377-390, Refs. p.386-390.
Reichardt, P.B.
Plants (botany), Tundra, Taiga, Climatic changes, Nutrient cycle, Ecosystems.

46-2384
Modeling the response of arctic plants to changing climate.
Reynolds, J.F., et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.413-438, Refs. p.434-438.
Leadley, P.W.
Models, Plants (botany), Climatic changes, Growth, Carbon dioxide, Mosses, Lichens.

46-2385
Arctic plant physiological ecology in an ecosystem context.
Chapin, F.S., III, et al, Arctic ecosystems in a changing climate; an ecophysiological perspective. Edited by F.S. Chapin III, et al, San Diego, CA, Academic Press, 1992, p.441-451, 9 refs.
Plants (botany), Plant physiology, Plant ecology, Ecosystems, Climatic changes, Tundra.

46-2386
Remote sensing of ice and snow: review and status.
Carsey, F., *International journal of remote sensing*, Jan. 10, 1992, 13(1), p.5-11, 30 refs.
Remote sensing, Spaceborne photography, Ice cover, Snow cover, Geophysical surveys, Instruments, Data processing.

46-2387
Remote sensing of clouds and surface radiation budget over polar regions.
Raschke, E., et al, *International journal of remote sensing*, Jan. 10, 1992, 13(1), p.13-22, 20 refs.
Bauer, P., Lutz, H.J.
Cloud cover, Radiometry, Detection, Radiation balance, Polar atmospheres, Snow cover effect, Remote sensing, Scattering, Albedo, Solar radiation.
This paper shows that clouds can be monitored over the polar regions with respect to their occurrence and water phase, using the multispectral data of the AVHRR onboard NOAA satellites. Estimates of cloud transmittance for the total downward solar radiation appear feasible, while no method has yet been developed to estimate the downward atmospheric radiation. (Auth. mod.)

46-2388
Sea ice distribution in the Greenland and Barents Seas based on satellite information for the period 1966-89.
Eckardt, M., et al, *International journal of remote sensing*, Jan. 10, 1992, 13(1), p.23-35, 12 refs.
Gallas, J., Tonn, W.
Sea ice distribution, Ice detection, Radiometry, Spaceborne photography, Image processing, Ice edge, Seasonal variations, Meteorological data.

46-2389
Effects of weather on the retrieval of sea ice concentration and ice type from passive microwave data.
Maslanik, J.A., *International journal of remote sensing*, Jan. 10, 1992, 13(1), p.37-54, 19 refs.
Sea ice distribution, Radiometry, Meteorological factors, Spaceborne photography, Ice conditions, Radiation balance, Accuracy, Brightness, Classifications.

46-2390
Satellite case study of a katabatic surge along the Transantarctic Mountains.
Bromwich, D.H., *International journal of remote sensing*, Jan. 10, 1992, 13(1), p.55-66, 16 refs.
Sea ice distribution, Spaceborne photography, Wind factors, Ice melting, Ice air interface, Infrared photography, Atmospheric circulation, Antarctica—Transantarctic Mountains.
A low-light visible/near-infrared satellite image of the Ross Ice Shelf area on Nov. 1, 1986 showed a cloud-free region along the Transantarctic Mountains from the Liv Glacier northward. The corresponding thermal infrared image indicated that the clear area was a katabatic air mass, fed by katabatic winds blowing from the main glacier valleys that dissect the Transantarctic Mountains. The cloud-free area broadened to the north and its western edge passed just to the east of Minna Bluff. The katabatic air mass crossed the edge of the Ross Ice Shelf, extended about 350 km offshore and developed cloud streets. Thus, this katabatic airstream appeared to propagate horizontally for over 1300 km. Analyses are presented of its association with the regional atmospheric circulation, of its time evolution and of its probable impact on the sea ice cover over the Ross Sea. Aspects of the governing dynamics are discussed. (Auth. mod.)

46-2391
Wind and temperature regime in Mizuho Plateau, East Antarctica.
Kikuchi, T., et al, *International journal of remote sensing*, Jan. 10, 1992, 13(1), p.67-79, 22 refs.
Surface temperature, Snow temperature, Ice sheets, Radiometry, Wind factors, Spaceborne photography, Image processing, Brightness, Correlation, Antarctica—Mizuho Plateau.
Japanese Antarctic Research Expeditions have conducted a series of oversnow traverses in Mizuho Plateau, East Antarctica. Data have been collected on the annual mean temperatures, which are inferred from 10 m depth snow temperatures, and on the prevailing wind directions, which are inferred from the snow surface reliefs. Data from the ground-based observations have been combined with remotely sensed data both from satellites and aircraft. Annually averaged NOAA channel 5 brightness temperatures correlate well with the 10 m snow temperatures. The synthesized prevailing windfield shows a clear distinction between the katabatic wind system and that of the synoptic disturbances. Confluence zones are also identified, but their presence seems only intermittent. A slight but significant climate difference has been observed between ridges and troughs of the plateau due to the difference in katabatic wind forces. (Auth.)

46-2392
High-latitude moisture structure determined from HIRS water vapour imagery.
Turner, J., et al, *International journal of remote sensing*, Jan. 10, 1992, 13(1), p.81-95, 15 refs.
Ellrott, H.
Polar atmospheres, Radiometry, Water vapor, Radiance, Sounding, Infrared photography, Weather forecasting, Fronts (meteorology).
An atmospheric transmittance model has been applied to antarctic radiosonde ascents in order to examine the high-latitude normalized weighting functions of the water vapor channels on the High Resolution Infrared Radiation Sounder. In the antarctic coastal region the 6.7 micron radiances are shown to be largely atmospheric in origin, and imagery created from these data can provide useful diagnostic information on tropospheric water vapor, even during the winter months. The 7.3 micron data contain a large surface contribution and have less value as a diagnostic tool. An example is shown of HIRS water vapor imagery of the Antarctic at a time when a cold front was descending from the Antarctic Plateau to the coastal area. The imagery clearly showed the dry air behind the front and provided information that was not available with any other imagery channel. A second example of a North Atlantic polar low shows the contaminating effect of cloud when deep atmospheric systems are being examined. (Auth. mod.)

46-2393
Pattern recognition analysis of polar clouds during summer and winter.
Ebert, E.E., *International journal of remote sensing*, Jan. 10, 1992, 13(1), p.97-109, 28 refs.
Polar atmospheres, Cloud cover, Spaceborne photography, Radiometry, Classifications, Image processing, Synoptic meteorology, Seasonal variations.
A pattern recognition algorithm is demonstrated which classifies eighteen surface and cloud types in high-latitude AVHRR imagery based on several spectral and textural features, then estimates the cloud properties (fractional coverage, albedo, and brightness temperature) using a hybrid histogram and spatial coherence technique. The summertime version of the algorithm uses both visible and infrared data (AVHRR channels 1-4), while the wintertime version uses only infrared data

(AVHRR channels 3- 5). Three days of low-resolution AVHRR imagery from the Arctic and Antarctic during Jan. and July 1984 were analyzed for cloud type and fractional coverage. The analysis showed significant amounts of high cloudiness in the Arctic during one day in winter. The antarctic summer scene was characterized by heavy cloud cover in the southern ocean and relatively clear conditions in the continental interior. A large region of extremely low brightness temperatures in East Antarctica during winter suggests the presence of polar stratospheric cloud. (Auth.)

46-2394
Cloud distribution in the Antarctic from AVHRR data and radiation measurements at the surface.
Yamanouchi, T., et al, *International journal of remote sensing*, Jan. 10, 1992, 13(1), p.111-127, 20 refs.
Kawaguchi, S.
Polar atmospheres, Cloud cover, Detection, Radiometry, Spaceborne photography, Image processing, Brightness, Climatic factors, Antarctica—Showa Station.
Cloud distributions were analyzed from the AVHRR data of the NOAA satellite received at Showa Station in Antarctica. Algorithms to derive cloud amount using the brightness temperature difference of infrared channels 3 and 4, or 4 and 5 were assessed by comparing the satellite cloud amount to the manual cloud amount and the downward longwave radiation at the ground surface. Cloud amounts obtained by the brightness temperature difference of channels 3 and 4 in summer agreed with the manual cloud amounts at the surface, and were highly correlated with the downward longwave fluxes. Cloud amounts from channels 4 and 5 showed a rough agreement with the surface cloud amounts. Distributions of cloud derived from the pilot datasets were examined. (Auth. mod.)

46-2395
Use of TOVS observations for the study of polar and arctic lows.
Claud, C., et al, *International journal of remote sensing*, Jan. 10, 1992, 13(1), p.129-139, 12 refs.
Scott, N.A., Chedin, A.
Polar atmospheres, Atmospheric disturbances, Spaceborne photography, Sounding, Cloud cover, Detection, Image processing.
Global observations from the satellites of the TIROS-N/NOAA series over polar regions, where the *in situ* measurements are scarce, constitute a valuable source for the study of mesoscale meteorological phenomena after conversion of these observations to atmospheric and surface parameters. The 3I (Improved Initialization Inversion) system, which relies on a pattern-recognition-type approach, has been applied to NOAA-9 and NOAA-10 passes of both hemispheres and at different periods of the year. Results show that the 3I method is able to identify cyclonic conditions. Comparisons between retrieved products and conventional products show a good agreement. The first assimilation experiments of 3I temperature profiles into a fine mesh model seem promising. (Auth. mod.)

46-2396
Use of a simultaneous physical retrieval scheme for satellite derived atmospheric temperatures: Weddell Sea, Antarctica.
Lachlan-Cope, T.A. *International journal of remote sensing*, Jan. 10, 19. , 13(1), p.141-154, 10 refs.
Polar atmospheres, Air temperature, Temperature measurement, Sounding, Radiometry, Statistical analysis, Correlation, Antarctica—Weddell Sea.
Atmospheric temperature retrievals obtained by a simultaneous physical scheme and a statistical scheme are compared using data gathered over the Weddell Sea during Jan. 1986. Ground truth data were obtained from radiosonde ascents. The statistical approach gave errors smaller than those of the physical method. Several modifications to the physical scheme were tried but, although some individual retrievals did show an improvement, the errors were still greater than for the statistical scheme. The results are for retrievals over the sea or low-lying coast; it is expected that the physical scheme will give better results than the statistical scheme over the high antarctic plateau, as it allows for the effect of ground elevation in the temperature profile determination. (Auth.)

46-2397
***Use of climatological observations as ground truth* for distributions of minimum temperature derived from AVHRR data.**
McClatchey, J., *International journal of remote sensing*, Jan. 10, 1992, 13(1), p.155-163, 22 refs.
Surface temperature, Snow cover effect, Radiometry, Temperature measurement, Brightness, Climatology, Accuracy, Temperature variations.

46-2398
Hammer blow seismic investigations in the high ranges of northern Tibet. [Hammerschlag-seismische Untersuchungen in Hochgebirgen Nord-Tibets],
Ortlam, D., *Zeitschrift für Geomorphologie*, Dec. 1991, 35(4), p.385-399, In German with English and French summaries. 11 refs.
Rock glaciers, Seismic surveys, Geocryology, Quaternary deposits, Permafrost distribution, Portable equipment, Geologic surveys, Tibet.

46-2399
Mass movement deposits in the Karakoram Mountains: their sedimentary characteristics, recognition and role in Karakoram landform evolution.
Owen, L.A., *Zeitschrift für Geomorphologie*, Dec. 1991, 35(4), p.401-424, With German and French summaries. 27 refs.
Mountains, Mass movements (geology), Sediment transport, Landscape development, Glacial deposits, Geologic processes, Geomorphology, Pakistan.

46-2400
Stratified talus deposits near the Gaspé Peninsula (Quebec, Canada). [Éboulis stratifiés actifs près de Manche- d'Épée, Gaspésie (Québec, Canada)],
Hétu, B., *Zeitschrift für Geomorphologie*, Dec. 1991, 35(4), p.439-461, In French with German and English summaries. 25 refs.
Talus, Periglacial processes, Slope processes, Sedimentation, Snow cover effect, Geocryology.

46-2401
Post-glacial rebound and asthenosphere viscosity in Iceland.
Sigmundsson, F., *Geophysical research letters*, June 1991, 18(6), p.1131-1134, 24 refs.
Ice sheets, Glacier mass balance, Glacier oscillation, Isostasy, Tectonics, Viscosity, Geologic processes, Altitude, Iceland.

46-2402
***Automatic classification procedure for coping with* clouds in LANDSAT TM data.**
Schanzer, D.L., *Canadian journal of remote sensing*, Jan. 1992, 18(1), p.30-43, With French summary. 28 refs.
LANDSAT, Cloud cover, Detection, Classifications, Radiance, Snow cover effect, Image processing, Spaceborne photography, Analysis (mathematics), Visibility.

46-2403
Science issues relating to marine aspects of the cryosphere: implications for remote sensing.
Barber, D.G., et al, *Canadian journal of remote sensing*, Jan. 1992, 18(1), p.46-54.
Sea ice, Classifications, Remote sensing, Geophysical surveys, Physical properties, Design criteria, Meetings, Air ice water interaction.

46-2404
Calcium magnesium acetate deicer.
Fritzsche, C.J., *Water environment & technology*, Jan. 1992, 4(1), p.44-51.
Road icing, Ice removal, Salting, Environmental impact, Countermeasures, Water pollution, Chemical analysis.

46-2405
Conditioning of excess activated sludge by freezing and thawing. Changes in the settling characteristics of the sludge floc.
Kawasaki, K., et al, *International chemical engineering*, Oct. 1991, 31(4), p.701-707, Translated from Kagaku kogaku ronbunshu, 1990, Vol.16, No.1. 14 refs.
Matsuda, A., Ide, T., Murase, T.
Sludges, Freeze thaw cycles, Waste treatment, Freezing rate, Sediments, Performance, Physical properties, Gravity.

46-2406
Endothermic wetting effect and the mechanism of the ice-forming action of AgI.
Smorodin, V.E., *Colloid journal of the USSR*, Sep. 1991, 53(2), p.249-256, Translated from Kolloidnĭ zhurnal, Mar.-Apr., 1991. 25 refs.
Water films, Substrates, Silver iodide, Ice formation, Wettability, Ice nuclei, Surface structure, Thermodynamics, Temperature effects.

46-2407
Recombination injection of charge carriers in ice.
Petrenko, V.F., et al, *Soviet physics—solid state*, Oct. 1990, 32(10), p.1711-1714, Translated from Fizika tverdogo tela. 7 refs.
Chesnakov, V.A.
Ice electrical properties, Charge transfer, Electrical resistivity, Ion density (concentration), Molecular energy levels, Electrical measurement, Ion exchange.

46-2408
Nature of carriers in ice.
Petrenko, V.F., et al, *Soviet physics—solid state*, Aug. 1990, 32(8), p.1374-1377, Translated from Fizika tverdogo tela. 12 refs.
Chesnakov, V.A.
Ice electrical properties, Electrical resistivity, Proton transport, Charge transfer, Ice physics, Electrical measurement, Temperature effects.

46-2409
Monte Carlo study of a simple model bulk-ice-Ih system: P-T melting behavior at constant volume.
Han, K., et al, *Physical review B*, Jan. 1992, 45(1)I, p.29-35, 25 refs.
Hale, B.N.
Ice physics, Ice models, Ice melting, Computerized simulation, Molecular energy levels, Phase transformations, Liquid solid interfaces, Temperature effects, Molecular structure.

46-2410
Densities of vibrational states and heat capacities of crystalline and amorphous H2O ice determined by neutron scattering.
Klug, D.D., et al, *Physical review B*, July 1, 1991, 44(2)II, p.841-844, 27 refs.
Ice physics, Cubic ice, Amorphous ice, Neutron scattering, Heat capacity, Ice density, Molecular structure, Low temperature research.

46-2411
Low energy (<1 eV) electron transmission through condensed layers of water.
Jo, S.K., et al, *Journal of chemical physics*, Apr. 15, 1991, 94(8), p.5761-5764, 32 refs.
White, J.M.
Ice physics, Amorphous ice, Metals, Photochemical reactions, Electrical resistivity, Ice electrical properties, Scattering, Deuterium oxide ice.

46-2412
Finite element method for snow melting and water infiltration in a layered subfreezing snowpack.
Tseng, P.H., Boulder, University of Colorado, 1991, 180p., University Microfilms order No.DA9132626, Ph.D. thesis. Refs. p.170-180.
Snow melting, Snow hydrology, Snow permeability, Snow heat flux, Snow thermal properties, Seepage, Ice water interface, Mathematical models, Snow cover structure.

46-2413
More effective de-icing with less salt. Final report *of the MINSALT-project; summary*.
Öberg, G., et al, *Sweden. Statens väg- och trafikinstitut. VTI rapport*, 1991, No.369 SA, 58p.
Gustafson, K., Axelson, L.
Road icing, Road maintenance, Salting, Chemical ice prevention.

46-2414
Glaciers of the Swiss Alps 1979/80 and 1980/81. [Die Gletscher der Schweizer Alpen 1979/80 und 1980/81],
Aellen, M., *Schweizerische Naturforschende Gesellschaft. Gletscherkommission. Glaziologisches Jahrbuch. Bericht*, 1988, No.101/102, 144p., In German and French with English summary. 25 refs.
Glacier surveys, Glacier oscillation, Mountain glaciers, Glacier mass balance, Switzerland.

46-2415
Morphology and flow conditions *in mountain* streams: a method to determine residual runoff. [Morphologie und Strömungsverhältnisse in Gebirgsbachen: ein Verfahren zur Festlegung von Restwasserabflüssen],
Schälchli, U., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen*, 1991, No.113, 112p., In German with French and English summaries. 24 refs.
Stream flow, Runoff forecasting, Flow measurement, Statistical analysis, Meltwater, Switzerland.

46-2416
***Outer Continental Shelf Environmental* Assessment Program; Final reports of principal investigators, Vol.74.** Anchorage, AK, U.S. National Oceanic and Atmospheric Administration, Arctic Environmental Assessment Center, Oct. 1991, 534p., OCS/MMS 91-0085, Refs. passim. Contains 7 papers.
Air ice water interaction, Drift, Ship icing, Ocean waves, Ocean currents, Storms, Marine meteorology, Sediment transport, United States—Alaska—Norton Sound, Beaufort Sea, Chukchi Sea.

46-2417
Satellite daytime image classification for global studies of earth's surface parameters from polar orbiters.
Gutman, G.G., *International journal of remote sensing*, Jan. 20, 1992, 13(2), p.209-234, 24 refs.
Spaceborne photography, Classifications, Radiometry, Radiation balance, Image processing, Cloud cover, Snow cover effect, Insolation, Surface temperature.

46-2418
Surficial geology of the Canadian eastern arctic and polar continental shelves.
Andrews, J.T., et al, *Continental shelf research*, Aug.-Oct. 1991, 11(8-10), Canadian Continental Shelf Seabed Symposium, Dartmouth, Nova Scotia, Oct. 2-7, 1989. Proceedings. Edited by C.L. Amos and M. Collins, p.791-819, Refs. p.814-819.
Marine geology, Ocean bottom, Bottom sediment, Sediment transport, Ice scoring, Stratigraphy, Oceanography, Marine deposits.

46-2419
Sedimentation on the Canadian Beaufort Shelf.
Hill, P.R., et al, *Continental shelf research*, Aug.-Oct. 1991, 11(8-10), Canadian Continental Shelf Seabed Symposium, Dartmouth, Nova Scotia, Oct. 2-7, 1989. Proceedings. Edited by C.L. Amos and M. Collins, p.821-842, Refs. p.840-842.
Blasco, S.M., Harper, J.R., Fissel, D.B.
Marine geology, Ocean bottom, Marine deposits, Sedimentation, Bottom sediment, Ice scoring, Sediment transport, Oceanography, Ocean currents, Beaufort Sea.

46-2420
Chemical interactions and sediments of the western Canadian Arctic Shelf.
Macdonald, R.W., et al, *Continental shelf research*, Aug.-Oct. 1991, 11(8-10), Canadian Continental Shelf Seabed Symposium, Dartmouth, Nova Scotia, Oct. 2-7, 1989. Proceedings. Edited by C.L. Amos and M. Collins, p.843-863, Refs. p.859-863.
Thomas, D.J.
Marine geology, Ocean bottom, Geochemistry, Ice scoring, Sediment transport, Bottom sediment, Marine deposits, Climatic changes, Arctic Ocean.

46-2421
Engineering concerns for the Canadian Arctic continental shelf.
Kamphuis, J.W., *Continental shelf research*, Aug.-Oct. 1991, 11(8-10), Canadian Continental Shelf Seabed Symposium, Dartmouth, Nova Scotia, Oct. 2-7, 1989. Proceedings. Edited by C.L. Amos and M. Collins, p.885-895, 25 refs.
Marine geology, Engineering geology, Offshore drilling, Ocean bottom, Offshore structures, Ice loads, Design criteria, Artificial islands.

46-2422
Towards an understanding of sediment deposition on glaciated continental shelves.
Syvitski, J.P.M., *Continental shelf research*, Aug.-Oct. 1991, 11(8-10), Canadian Continental Shelf Seabed Symposium, Dartmouth, Nova Scotia, Oct. 2-7, 1989. Proceedings. Edited by C.L. Amos and M. Collins, p.897-937, Refs. p.932-937.
Ice sheets, Ocean bottom, Sediment transport, Marine geology, Ice shelves, Quaternary deposits, Marine deposits, Stratigraphy.
In this paper a simple vertical stratigraphic sequence of Quaternary deposits is recognized on 20 glaciated shelves from around the world reflecting the transition from the most recent glacial to interglacial period. This sequence includes some or all of the following: ice-contact (ice-deposited and/or ice-loaded) sediments; ice-proximal sediments; ice-distal sediments; paraglacial coastal sediments; and post-glacial sediments. Typically, the sequence overlies sedimentary rocks on the outer shelf and a mixed bedrock basement on the inner shelf. The relative volume of these deglacial units provides important clues for the reconstruction of ice sheet dynamics. Outstanding seismostratigraphic problems include: distinguishing ice-loaded glacial-marine sediments from subglacially deposited till; distinguishing till from other ice-contact deposits such as grounding-line fans; and distinguishing till from non-glacial debris flow deposits. The incorrect identification of till provides poor data control on ice sheet reconstruction, ice sheet properties and dynamics, especially as related to sediment transport. (Auth. mod.)

46-2423
Physical processes of seabed disturbance during iceberg grounding and scouring.
Woodworth-Lynas, C.M.T., et al, *Continental shelf research*, Aug.-Oct. 1991, 11(8-10), Canadian Continental Shelf Seabed Symposium, Dartmouth, Nova Scotia, Oct. 2-7, 1989. Proceedings. Edited by C.L. Amos and M. Collins, p.939-961, 24 refs.
Icebergs, Ice scoring, Sediment transport, Marine geology, Ocean bottom, Bottom topography, Ice solid interface, Oceanography, Labrador Sea.

46-2424
Interrelationship between the ice and hydrometeorological processes in the southern ocean. [O vzaimosviazi ledovykh i gidrometeorologicheskikh protsessov v IUzhnom okeane],
Liubarskiĭ, A.N., et al, *Vsesoiuznyĭ simpozium* "Meteorologicheskie issledovaniia v Antarktike," 3rd, Leningrad, Oct. 22-24, 1986. Sbornik dokladov (All-Union Symposium "Meteorological investigations in the Antarctic", 3rd, Leningrad, Oct. 22-24, 1986. Proceedings). Vol.1, Leningrad, Gidrometeoizdat, 1990, p.26-29, In Russian. 4 refs.
Romanov, A.A., Chepurina, M.A.
Sea ice, Ice volume, Seasonal variations, Meteorological factors.
The mechanism of interseasonal and interannual variations of sea ice formation in the southern ocean and its individual sectors is investigated. An analysis is made confirming the link between the ice regime variations and the thermal and circulation regimes of sea and air. The significance of the ice cover as one of the basic components of the antarctic climatic system is pointed out.

46-2425
Atmospheric precipitation in Antarctica and its long-term variability. [Atmosfernye osadki v Antarktide i ikh mnogoletniaia izmenchivost'],
Briazgin, N.N., Vsesoiuznyĭ simpozium "Meteorologicheskie issledovaniia v Antarktike," 3rd, Leningrad, Oct. 22-24, 1986. Sbornik dokladov (All-Union Symposium "Meteorological investigations in the Antarctic", 3rd, Leningrad, Oct. 22-24, 1986. Proceedings). Vol.1, Leningrad, Gidrometeoizdat, 1990, p.30-34, In Russian. 6 refs.
Precipitation (meteorology), Snowfall, Statistical analysis.
Different methods for the correction of atmospheric precipitation data are investigated. The variability in monthly totals of precipitation at antarctic stations is analyzed. The dependence of statistical characteristics of precipitations on their calendar duration is determined, which permits one to assess the accuracy of the precipitation monthly total values. The increasing trend of precipitation is measured from the long- term fluctuations. A direct relation is found between increasing air temperature and precipitation volume.

46-2426
Penetration of solar radiation into the artificially compacted snow of runways. [Proniknovenie solnechnoĭ radiatsii v iskusstvenno uplotnennoe snezhnoe pokrytie VPP],
Nazarov, V.D., Vsesoiuznyĭ simpozium "Meteorologicheskie issledovaniia v Antarktike," 3rd, Leningrad, Oct. 22-24, 1986. Sbornik dokladov (All-Union Symposium "Meteorological investigations in the Antarctic", 3rd, Leningrad, Oct. 22-24, 1986. Proceedings). Vol.1, Leningrad, Gidrometeoizdat, 1990, p.68-71, In Russian.
Ice runways, Safety, Snow compaction, Temperature effects, Antarctica—Molodezhnaya Station.
A comparative study of solar radiation penetration and weakening coefficient values of naturally compacted versus artificially compacted snow of the Molodezhnaya runway is discussed. It is found that, although the runway's surface layer permits greater radiation penetration than that of the naturally compacted snow, it slows down the radiation percolation to the underlying layers of the structure, protecting them from excessive solar heat and providing greater safety for aircraft operations.

46-2427
Approximate evaluation of climatic system susceptibility to its radiation parameters in the Golitsyn-Ginzburg model. [Priblizhennaia otsenka chuvstvitel'nosti klimaticheskoĭ sistemy k ee radiatsionnym parametram v modeli Golitsyna-Ginzburga],
Voskresenskiĭ, A.I., et al, Vsesoiuznyĭ simpozium "Meteorologicheskie issledovaniia v Antarktike," 3rd, Leningrad, Oct. 22-24, 1986. Sbornik dokladov (All-Union Symposium "Meteorological investigations in the Antarctic", 3rd, Leningrad, Oct. 22-24, 1986. Proceedings). Vol.1, Leningrad, Gidrometeoizdat, 1990, p.98-101, In Russian. 4 refs.
Baranov, G.I., Liubarskiĭ, A.N.
Climatic changes, Ice cover effect, Snow cover effect, Solar radiation, Models.
Using a simple Golitsyn-Ginzburg model of the global thermal regime, the susceptibility of the climatic system to basic radiation parameters is evaluated. It is found that the climatic system is least susceptible to the integral function of transmission, and most susceptible to the incoming radiation, at the upper atmospheric boundary. Variations of relative susceptibility of the climatic system induced by snow and ice edge variations are calculated for the last 75,000 years.

46-2428
Spectral albedo of the antarctic snow surface. [Spektral'noe al'bedo zasnezhennoĭ poverkhnosti Antarktidy],
Sakunov, G.G., et al, Vsesoiuznyĭ simpozium "Meteorologicheskie issledovaniia v Antarktike," 3rd, Leningrad, Oct. 22-24, 1986. Sbornik dokladov (All-Union Symposium "Meteorological investigations in the Antarctic", 3rd, Leningrad, Oct. 22-24, 1986. Proceedings). Vol.1, Leningrad, Gidrometeoizdat, 1990, p.110-115, In Russian. 6 refs.
Snow surface, Snow air interface, Albedo.
Spectral measurements of surface albedo, conducted at Molodezhnaya, Vostok and Mirnyy Stations from Dec. 1984 to Mar. 1985, are discussed. Tabulated results, showing date, sun altitude, integral albedo, wavelength, cloudiness and snow surface characteristics, are presented. The highest values were recorded on Jan. 30 and Mar. 7 on a wavelength of 1100 nm. For another version of this paper see 17F-40179 or 43-4541.

46-2429
Properties of atmospheric processes over the south polar region and their influence on ice conditions in the antarctic seas in 1983-1985. [Osobennosti atmosfernykh protsessov nad iuzhnoĭ poliarnoĭ oblast'iu i ikh vlianie na ledovye usloviia antarkticheskikh morei v 1983-1985 gg.],
Riabkov, G.E., et al, Vsesoiuznyĭ simpozium "Meteorologicheskie issledovaniia v Antarktike," 3rd, Leningrad, Oct. 22-24, 1986. Sbornik dokladov (All-Union Symposium "Meteorological investigations in the Antarctic", 3rd, Leningrad, Oct. 22-24, 1986. Proceedings). Vol.1, Leningrad, Gidrometeoizdat, 1990, p.168-171, In Russian. 4 refs.
Bozhkov, A.T.
Ice conditions, Sea ice distribution, Atmospheric circulation, Ice air interface.
The relationship between atmospheric processes and sea ice conditions in 1983-1985 is discussed. The dominant role of atmospheric circulation in the deviation of ice processes from long-term average conditions is established. The role of thermal and dynamic factors in the inertia of ice phenomena is evaluated.

46-2430
Link between atmospheric and ice processes and navigation in the Pacific sector of the Antarctic in 1985-1986. [O sviazi atmosfernykh i ledovykh protsessov v tikhookeanskom sektore Antarktiki v navigatsiiu 1985/86 g.],
Lutsenko, E.I., Vsesoiuznyĭ simpozium "Meteorologicheskie issledovaniia v Antarktike," 3rd, Leningrad, Oct. 22-24, 1986. Sbornik dokladov (All-Union Symposium "Meteorological investigations in the Antarctic", 3rd, Leningrad, Oct. 22-24, 1986. Proceedings). Vol.1, Leningrad, Gidrometeoizdat, 1990, p.171-174, In Russian. 6 refs.
Atmospheric circulation, Ice navigation, Sea ice distribution, Ice edge, South Pacific Ocean.
Synoptic and satellite data obtained during the POLEX- South-86 expedition, on atmospheric processes and sea ice distribution over the western portion of the South Pacific Ocean, are analyzed. A cause-effect relationship is found between atmospheric anomalies observed in Feb. 1986 and those observed in sea ice distribution. The nature of the main area of cyclogenesis in the investigated region is considered.

46-2431
Denudation in the cryolithozone; collected scientific papers. [Denudatsiia v kriolitozone; sbornik nauchnykh trudov],
Mel'nikov, P.I., ed, Moscow, Nauka, 1991, 153p., In Russian. Refs. passim. For individual papers see 46-2432 through 46-2447.
Popov, A.I., ed.
Geocryology, Freeze thaw cycles, Solifluction, Erosion, Slope processes, Active layer, Surface properties, Lithology, Water erosion, Permafrost weathering, Seasonal freeze thaw, Hydrothermal processes.

46-2432
Cryogenesis and chemical denudation. [Kriogenez i khimicheskaia denudatsiia],
Konishchev, V.N., Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.4-9, In Russian. 9 refs.
Permafrost weathering, Runoff, Ions, Water erosion, Freeze thaw cycles, Hydrothermal processes.

46-2433
Reflection of denudation processes in the composition and structure of surface deposits in Central Yakutia. [Otrazhenie protsessov denudatsii v sostave i stroenii sklonovykh otlozheniĭ Tsentral'noĭ IAkutii],
Zigert, Kh., et al, Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.10-18, In Russian. 9 refs.
Slagoda, E.A.
Surface structure, Erosion, Surface properties, Active layer, Lithology, Geocryology.

46-2434
Microstructure of permafrost surface deposits on the Kisily Range. [Mikrostroenie mnogoletnemerzlykh sklonovykh otlozheniĭ griady Kisiliakh],
Slagoda, E.A., Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.19-29, In Russian.
Microstructure, Quaternary deposits, Surface properties, Geocryology.

46-2435
Mechanism and origins of the salinization of deposits of the ice complex of Yakutia. [Mekhanizm i istochniki zasoleniia otlozheniĭ ledovogo kompleksa IAkutii],
Konishchev, V.N., et al, Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.29-37, In Russian. 13 refs.
Plakht, I.R.
Glacial deposits, Salinity, Hydrogeochemistry, Freeze thaw cycles, Origin.

46-2436
***Intensity* of surface cryogenic processes in the cryolithozone.** [Intensivnost' sklonovykh kriogennykh protsessov v kriolitozone],
Rozenbaum, G.E., et al, Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.37-48, In Russian. 26 refs.
Mudrov, IU.V., Tumel', N.V.
Geocryology, Lithology, Solifluction, Ice needles, Seasonal freeze thaw, Surface structure.

46-2437
Investigations of steady-state cryogenic relief- forming processes in northwestern Canada. [Statsionarnye issledovaniia kriogennykh rel'efoobrazuiushchikh protsessov na severo-zapade Kanady],
Rozenbaum, G.E., et al, Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.48-62, In Russian. 27 refs.
Tumel', N.V.
Geocryology, Pingos, Ice wedges, Patterned ground, Ice cracks.

46-2438
Regularities in the hydrothermal interaction of water flow with frozen ground. [Zakonomernosti gidrotermicheskogo vzaimodeĭstviia vodnykh potokov s merzlymi gruntami],
Poznanin, V.L., Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.62-73, In Russian. 10 refs.
Hydrothermal processes, Frozen ground mechanics, Water erosion, Water temperature, Ground ice, Statistical analysis.

46-2439
***Characteristics of the melting away of ground ice during* gully thermoerosion.** [Spetsifika vytaivaniia podzemnykh l'dov v protsesse razvitiia ovrazhnoĭ termoeroziĭ],
Poznanin, V.L., Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.73-82, In Russian. 12 refs.
Ground ice, Gullies, Temperature effects, Ice melting, Erosion.

46-2440
Fractional sorting of material as a factor in cryogenic denudation. [Fraktsionnaia sortirovka materiala kak faktor kriogennoĭ denudatsii],
Zhigarev, L.A., Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.82-91, In Russian. 6 refs.
Geocryology, Ice erosion, Glacial erosion, Sorting, Solifluction.

46-2441
Characteristics of the distribution of relief-forming cryogenic processes in western Yamal. [Osobennosti rasprostraneniia rel'efoobrazuiushchikh kriogennykh protsessov na zapade IAmala],
Leĭbman, M.O., et al, Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.92-99, In Russian.
Lakhtina, O.V., Titova, I.R., Mikliaev, S.M.
Geocryology, Temperature effects, Topographic features, Frost heave, Peat.

46-2442
***Characteristics of the cryomorphogenesis of denudation* surfaces in western and eastern sectors of the Arctic.** [Osobennosti kriomorfogeneza denudatsionnykh poverkhnosteĭ zapadnogo i vostochnogo sektorov Arktiki],
Pukemo, M.N., Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.99-106, In Russian. 8 refs.
Geocryology, Geomorphology, Solifluction, Terraces, Surface properties, Deformation.

46-2443
Characteristics of cryogenic denudation on Kolguyev Island. [Osobennosti kriogennoĭ denudatsii na o. Kolguev],
Mudrov, IU.V., Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.106-112, In Russian.
Geocryology, Glacial erosion, Ice erosion, Thermokarst, Nivation.

46-2444
Slope processes and phenomena in the cryolithozone of Tien Shan. [Sklonovye protsessy i iavleniia kriolitozony Tian'- Shania],
Ermolin, E.D., et al, Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.113-122, In Russian. 5 refs.
Severskiĭ, E.V.
Slope processes, Geocryology, Solifluction, Erosion.

46-2445
Characteristics of ice formation in rock streams. [Osobennosti l'doobrazovaniia v kurumakh],
Mal'chikova, I.IU., Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.122-132, In Russian. 9 refs.
Ice formation, Rock streams, Active layer, Snow water content, Seasonal freeze thaw.

46-2446
Some regularities in denudation and relief-formation *in Central Asia (in the example of eastern Hangay).* [Nekotorye zakonomernosti denudatsii i rel'efoobrazovaniia v Tsentral'noĭ Azii (na primere Vostochnogo Khangaia)],
Chigir, V.G., Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.132-145, In Russian. 3 refs.
Geocryology, Solifluction, Geomorphology, Slope processes.

46-2447
Deteriorated sagging dolerites and their role in relief-formation on a trap-rock plateau in the Central Siberian Plateau. [Razrushennye prosadochnye dolerity i ikh rol' v rel'efoobrazovanii na trappovom plato Srednesibirskogo ploskogor'ia],
Ivanov, M.S., Denudatsiia v kriolitozone; sbornik nauchnykh trudov (Denudation in the cryolithozone; collected scientific papers). Edited by P.I. Mel'nikov and A.I. Popov, Moscow, Nauka, 1991, p.146-151, In Russian. 7 refs.
Geocryology, Lithology.

46-2448
Investigation of physical properties of the interface between a light-emitting diode and an electronic conductor.
Petrenko, V.F., et al, *Soviet physics--solid state*, Sep. 1990, 32(9), p.1539-1542, Translated from Fizika tverdogo tela. 6 refs.
Chesnakov, V.A.
Ice solid interface, Photochemical reactions, Electrical resistivity, Ice electrical properties, Charge transfer, Physical properties.

46-2449
Observations of the total ozone content in the Arctic over Heiss Island (81N) in winter 1989.
Dorokhov, V.M., *Atmospheric optics*, Jan. 1990, 3(1), p.89-94, Translated from Optika atmosfery. 8 refs.
Polar atmospheres, Atmospheric composition, Ozone, Photometry, Atmospheric density, Aerial surveys, Periodic variations.

46-2450
Corona-producing cirrus cloud properties derived from polarization lidar and photographic analyses.
Sassen, K., *Applied optics*, Aug. 20, 1991, 30(24), p.3421-3428, 20 refs.
Cloud physics, Optical phenomena, Ice crystal optics, Lidar, Temperature effects, Climatology, Scattering.

46-2451
New spectrum of Triton near the time of the Voyager encounter.
Grundy, W.M., et al, *Icarus*, Oct. 1991, 93(2), p.379-385, 34 refs.
Fink, W.
Extraterrestrial ice, Satellites (natural), Albedo, Radiation absorption, Terrain identification, Image processing, Triton, Spectra, Surface properties.

46-2452
Laboratory reflectance measurements of analogues to "dirty" ice surfaces on atmosphereless solar system bodies.
Stephens, J.R., et al, *Icarus*, Nov. 1991, 94(1), p.209-217, 43 refs.
Gustafson, B.A.S.
Extraterrestrial ice, Porous materials, Simulation, Reflectivity, Ice optics, Ice sublimation, Spectra, Optical properties.

46-2453
Convection and lithospheric strength in Dione, an icy satellite of Saturn.
Forni, O., et al, *Icarus*, Nov. 1991, 94(1), p.232-245, 46 refs.
Coradini, A., Federico, C.
Extraterrestrial ice, Satellites (natural), Regolith, Convection, Thermal stresses, Geologic processes, Mathematical models, Temperature gradients.

46-2454
Breaks in the marine ice cover.
Kovshov, V.A., et al, *Soviet meteorology and hydrology*, 1990, No.7, p.85-91, Translated from Meteorologiia i gidrologiia. 22 refs.
Siniurin, IU.N.
Sea ice distribution, Ice edge, Orientation, Spaceborne photography, Photointerpretation, Fracture zones, Stresses, Tectonics, Marine geology.

46-2455
Proceedings, Volume II.
International Symposium on Ground Freezing, 3rd, Hanover, NH, June 22-24, 1982, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1982, 187p., Refs. passim. For selected papers see 41-3228 and 46- 2456 through 46-2466. For Vol.I see 37-3055 through 37-3110. Discussion of papers from Vol.I, this volume p.111-137.
Soil freezing, Artificial freezing, Frozen ground strength, Soil stabilization.

46-2456
Horizontal ground freezing for large tunnels.
Baerlocher, J.R., *International Symposium on Ground Freezing, 3rd, Hanover, NH, June 22-24, 1982. Proceedings, Vol.II, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1982,* p.11-29.
Soil freezing, Artificial freezing, Tunnels, Frozen ground strength, Soil stabilization.

46-2457
Creep behavior and strength of an artificially frozen silt under triaxial stress state.
Diekmann, N., et al, International Symposium on Ground Freezing, 3rd, Hanover, NH, June 22-24, 1982. Proceedings, Vol.II, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1982, p.31-37, 5 refs.
Jessberger, H.L.
Soil freezing, Artificial freezing, Frozen ground strength, Soil creep, Soil stabilization.

46-2458
Recent developments in ground freezing.
Gallavresi, F., International Symposium on Ground Freezing, 3rd, Hanover, NH, June 22-24, 1982. Proceedings, Vol.II, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1982, p.39-42, 1 ref.
Soil freezing, Artificial freezing, Frozen ground strength, Soil stabilization.

46-2459
Freezing of triaxial compression test specimens of cohesionless soil to determine internal density variations.
Gilbert, P.A., International Symposium on Ground Freezing, 3rd, Hanover, NH, June 22-24, 1982. Proceedings, Vol.II, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1982, p.43-57, 10 refs.
Soil freezing, Artificial freezing, Frozen ground strength, Frozen ground compression, Noncohesive soils, Compressive properties.

46-2460
Development of a methodology for predicting ground surface movement above tunnels in soft ground supported by ground freezing.
Jones, J.S., Jr., et al, International Symposium on Ground Freezing, 3rd, Hanover, NH, June 22-24, 1982. Proceedings, Vol.II, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1982, p.59-67, 8 refs.
Van Aller, H.W.
Soil freezing, Artificial freezing, Tunnels, Frozen ground strength, Soil stabilization, Soil creep.

46-2461
Modeling of influx of groundwater into excavation supported by an artificially frozen soil wall.
Jumikis, A.R., International Symposium on Ground Freezing, 3rd, Hanover, NH, June 22-24, 1982. Proceedings, Vol.II, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1982, p.69-75, 4 refs.
Soil freezing, Artificial freezing, Frozen ground strength, Soil stabilization, Seepage, Mathematical models.

46-2462
Effects of salinity on freezing of granular soils.
Mahar, L., et al, International Symposium on Ground Freezing, 3rd, Hanover, NH, June 22-24, 1982. Proceedings, Vol.II, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1982, p.77-82.
Vinson, T., Wilson, R.
Soil freezing, Artificial freezing, Frozen ground strength, Saline soils, Salinity, Freezing front.

46-2463
Electric freezing potentials in water and soils.
Parameswaran, V.R., International Symposium on Ground Freezing, 3rd, Hanover, NH, June 22-24, 1982. Proceedings, Vol.II, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1982, p.83-89, 15 refs.
Soil freezing, Ice electrical properties, Freezing potential (electrical).

46-2464
Ice detection by time domain reflectometry.
Smith, M.W., et al, International Symposium on Ground Freezing, 3rd, Hanover, NH, June 22-24, 1982. Proceedings, Vol.II, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1982, p.91-99, 3 refs.
Lewis, C.H., Patterson, D.E.
Ice lenses, Ice detection, Ice electrical properties, Unfrozen water content.

46-2465
Demonstration ground freezing project. International Symposium on Ground Freezing, 3rd, Hanover, NH, June 22-24, 1982. Proceedings, Vol.II, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1982, p.103-107.
Soil freezing, Artificial freezing, Frozen ground strength, Soil stabilization.

46-2466
Guidelines for classification and laboratory testing of artificially frozen ground.
ISGF Working Group on Testing Methods for Frozen Soils, International Symposium on Ground Freezing, 3rd, Hanover, NH, June 22-24, 1982. Proceedings, Vol.II, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1982, p.141-167, 71 refs.
Soil freezing, Artificial freezing, Frozen ground strength, Soil stabilization.

46-2467
Hydrometeorological phenomena resulting in natural disasters, and a system for their forecasting.
Vasil'ev, A.A., *Soviet meteorology and hydrology*, 1991, No.1, p.1-9, Translated from Meteorologiia i gidrologiia.
Precipitation (meteorology), Weather forecasting, Damage, Accuracy, Snowstorms, Periodic variations.

46-2468
Wet deposition in the South Baikal region.
Kokorin, A.O., et al, *Soviet meteorology and hydrology*, 1991, No.1, p.39-45, Translated from Meteorologiia i gidrologiia. 9 refs.
Politov, S.V.
Precipitation (meteorology), Snow surveys, Scavenging, Air pollution, Snow composition, Topographic effects, Chemical analysis.

46-2469
Precipitation acidity over the Baikal region.
Obolkin, V.A., et al, *Soviet meteorology and hydrology*, 1991, No.1, p.45-49, Translated from Meteorologiia i gidrologiia. 11 refs.
Khodzher, T.A., Anokhin, IU.A., Prokhorova, T.A.
Precipitation (meteorology), Chemical properties, Air pollution, Snow composition, Sampling, Meteorological factors.

46-2470
Districting the USSR territory for possible cloud dispersal by dry ice.
Belova, L.K., et al, *Soviet meteorology and hydrology*, 1991, No.1, p.87-91, Translated from Meteorologiia i gidrologiia. 7 refs.
Litvinov, I.V., Tsverava, V.G.
Cloud seeding, Dry ice (trademark), Clouds (meteorology), Classifications, Distribution, Natural resources, Meteorological factors.

46-2471
Pressure-temperature effects in planar Stefan problems with density change.
Charach, C., et al, *Journal of applied physics*, Feb. 1, 1992, 71(3), p.1128-1137, 25 refs.
Rubinstein, I.
Stefan problem, Phase transformations, Analysis (mathematics), Liquid solid interfaces, Pressure, Thermodynamics, Temperature effects.

46-2472
Quantum rigid dipole in a permanent electric field. 2. Model of librational motion in liquid water and ice Ih: preliminary results.
Kriachko, E.S., et al, *International journal of quantum chemistry*, July 1991, 40(1), p.55-66, 26 refs.
IAnovitskiĭ, O.E.
Ice physics, Molecular structure, Electric fields, Hydrogen bonds, Water structure, Oscillations, Spectra, Dielectric properties.

46-2473
Environmental records from polar ice cores.
Lorius, C., *Royal Society of London. Philosophical transactions. Series A*, Apr. 24, 1990, 330(1615), p.459-462, 11 refs.
Ice cores, Paleoclimatology, Isotope analysis, Solar activity.
Polar ice cores provide a wide range of information on past atmospheric climate (temperature, precipitation) and environment (gas and aerosol concentrations). The dating can be very accurate for the more recent part of the records but accuracy decreases with depth and time. Measurements of cosmogenic isotope concentrations (such as Be-10) provide information on paleo-precipitation rates, and particular events can be used to correlate ice core records. Besides these climatic applications, Be-10 concentration records in ice cores also contain information on solar activity changes. (Auth.)

46-2474
Be-10 and delta H-2 in polar ice cores as a probe of the solar variability's influence on climate.
Raisbeck, G.M., et al, *Royal Society of London. Philosophical transactions. Series A*, Apr. 24, 1990, 330(1615), p.463-470, 11 refs.
Yiou, F., Jouzel, J., Petit, J.R.
Ice cores, Paleoclimatology, Isotope analysis, Solar activity.
By using the technique of accelerator mass spectrometry, it is now possible to measure detailed profiles of cosmic ray-produced Be-10 in polar ice cores. Recent work has demonstrated that these profiles contain information on solar activity, via its influence on the intensity of galactic cosmic rays arriving in the Earth's atmosphere. It has been known for some time that, as a result of temperature-dependent fractionation effects, the stable isotope profiles delta O-2 and delta H-2 in polar ice cores contain paleoclimate information. Thus by comparing the Be-10 and stable isotope profiles in the same ice core, one can test the influence of solar variability on climate, and this independent of possible uncertainties in the absolute chronology of the records. Two antarctic ice cores, one from the South Pole covering the past ca. 1000 years, and one from Dome C covering the past ca. 3000 years are compared. (Auth. mod.)

46-2475
Past 5000 years history of solar modulation of cosmic radiation from Be-10 and C-14 studies.
Oeschger, H., et al, *Royal Society of London. Philosophical transactions. Series A*, Apr. 24, 1990, 330(1615), p.471-480, 12 refs.
Beer, J.
Ice cores, Paleoclimatology, Isotope analysis, Solar activity.
Be-10 is produced in a similar way to C-14 by the interaction of cosmic radiation with the nuclei in the atmosphere. Assuming that the Be-10 and C-14 variation are proportional and considering the different behavior in the Earth system, the Be-10 concentrations in ice cores can be compared with the C-14 variations in tree rings. A high correlation is found for the short-term variations (C-14-Suess-wiggles). They reflect with a high probability production rate variations. More problematic is the interpretation of the long-term trends of C-14 and Be-10. Several explanations are discussed. The reconstructed CO2 concentrations in ice cores indicate a nearly constant value (280 p.p.m. by volume) during the past few millenia. Measurements on the ice core from Byrd Station, Antarctica during the period 9,000 to 6,000 years BP indicate a decrease that might be explained by the extraction of CO2 from the atmosphere-ocean system to build the terrestrial biomass pool during the climatic optimum. (Auth.)

46-2476
Aquatic fulvic acids in microbially based ecosystems: results from two desert lakes in Antarctica.
McKnight, D.M., et al, *Limnology and oceanography*, July 1991, 36(5), p.998-1006, 18 refs.
Aiken, G.R., Smith, R.L.
Frozen lakes, Microbiology, Water chemistry, Lake ice, Ice cover effect, Deserts, Antarctica—Fryxell, Lake, Antarctica—Hoare, Lake.

46-2477
Water temperature dynamics and heat transfer beneath the ice cover of a lake.
Ellis, C.R., et al, *Limnology and oceanography*, Mar. 1991, 36(2), p.324-335, 16 refs.
Stefan, H.G., Gu, R.C.
Lake ice, Ice water interface, Ice cover effect, Ice bottom surface, Lake water, Water temperature, Heat transfer.

46-2478
Mackenzie Delta: environmental interactions and implications of development.
Marsh, P., ed, *Environment Canada. National Hydrology Research Institute, Saskatoon, Saskatchewan. NHRI symposium*, 1991, No.4, 195p., Proceedings of the Workshop on the Mackenzie Delta, Saskatoon, Saskatchewan, Oct. 17-18, 1989. Refs. passim. For selected papers see 46-2479 through 46-2486.
Ommanney, C.S.L., ed.
Hydrology, Flooding, Sediment transport, Deltas, Tundra, Canada—Northwest Territories—Mackenzie River Delta.

46-2479
Recharge of Mackenzie Delta lakes during winter.
Burn, C.R., *Environment Canada. National Hydrology Research Institute, Saskatoon, Saskatchewan. NHRI symposium*, 1991, No.4, Mackenzie Delta: environmental interactions and implications of development. Edited by P. Marsh and C.S.L. Ommanney, p.1-8, 6 refs.
Lake ice, Icebound lakes, Permafrost hydrology, Ice cover thickness, Water level, Taliks beneath lakes, Drainage, Bottom sediment, Frost heave, Canada—Northwest Territories—Mackenzie River Delta.

46-2480
Spatial variations in the spring flooding of Mackenzie Delta lakes.
Marsh, P., et al, *Environment Canada. National Hydrology Research Institute, Saskatoon, Saskatchewan. NHRI symposium*, 1991, No.4, Mackenzie Delta: environmental interactions and implications of development. Edited by P. Marsh and C.S.L. Ommanney, p.9-17, 10 refs.
Hey, M.
Lakes, Water level, Flooding, Deltas, Water balance, Snowmelt, Canada—Northwest Territories—Mackenzie River Delta.

46-2481
Influence of frequency and duration of flooding on the nutrient chemistry of Mackenzie Delta lakes.
Lesack, L.F.W., et al, *Environment Canada. National Hydrology Research Institute, Saskatoon, Saskatchewan. NHRI symposium*, 1991, No.4, Mackenzie Delta: environmental interactions and implications of development. Edited by P. Marsh and C.S.L. Ommanney, p.19-36, 23 refs.
Hecky, R.E., Marsh, P.
Lake water, Flooding, Water chemistry, Deltas, Nutrient cycle, Snowmelt, Ice cover effect, Canada—Northwest Territories—Mackenzie River Delta.

46-2482
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Baroni, C., *Società Geologica Italiana, Rome. Memorie*, 1988, Vol.43, Meeting on Earth Science in Antarctica, Siena, Sep. 27-28, 1988. Proceedings, p.123-144, With Italian summary. Refs. p.143-144.
Ice shelves, Glacier ice, Glacial deposits, Ice dating, Topographic surveys, Glacial geology, Antarctica—Hells Gate, Antarctica—Backstairs Passage Glacier.
Marine specimens mixed with supraglacial debris occur at the southern margin of the Hells Gate ice shelf (HGIS), which covers an area of about 70 sq km. Shells and debris seem to derive from the grounding line of the ice shelf. They have been incorporated by bottom freezing and then transferred to the ablation surface of the HGIS. Several C-14 dates have been obtained from shells mixed with supraglacial debris. The dates, uncalibrated, range from 1550 +/- 174 (GX-14625) to 2780 +/- 145 (GX-14097) yr B.P. Topographic surveys and C-14 datings were used to obtain preliminary values of some glaciological parameters of the HGIS (ice thickness, velocity, ice growth and ablation rates). The ice thickness of the southern part of the HGIS has been estimated at 63.5 m (eastern margin) and at 34.5 m (western margin). The surface velocity has been estimated at about 3 m/yr at the eastern margin of the HGIS. The ice growth rate has been estimated at 12.2-25 cm/yr at the western side of the ice shelf. A minimum rate of about 5 cm/yr has been recorded at Hells Gate East. The ablation rate has been estimated only at Hells Gate West, where it ranges from 16.5 cm to 36.3 cm/yr considering the ice lost in the last 3 km, on the basis of the difference between the calculated thickness of the HGIS with respect to different velocity values. A very small ice shelf (4-5 sq km) has been recorded in a cove near Backstairs Passage, an historic site of the Heroic Age. The occurrence of dirt cones and fossiliferous sediments on the ice surface of the Backstairs Passage cove implies an ice shelf nourished by bottom freezing, which entrained sediments and shells at its grounding line. Shells samples produced uncal C-14 ages ranging from 1435 +/- 120 (GX-14064) to 2265 +/- 140 (GX-14075) yr B.P. Only a minimum value for the ablation rate can be estimated; it ranges from 2 cm to 2.7 cm/yr, depending on the range of cal AD ages. (Auth. mod.)

46-2549
Holocene environmental changes at Terra Nova Bay (Victoria Land, Antarctica).
Orombelli, G., *Società Geologica Italiana, Rome. Memorie*, 1988, Vol.43, Meeting on Earth Science in Antarctica, Siena, Sep. 27-28, 1988. Proceedings, p.145-147, With Italian summary. 5 refs.
Glacial geology, Paleoclimatology, Geomorphology, Glacier ice, Ice shelves, Antarctica—Terra Nova Bay.
The Holocene history of Terra Nova Bay was dominated by the following events: deglaciation of the coastal area and lowering of the outlet glaciers, isostatic uplift and shoreline changes, fluctuations of local glaciers, ice shelves and snow fields, lake level variations and sporadic outburst floods, and return of life on land and in the coastal waters. The deglaciation was accomplished about 7000 yr BP when the first penguin rookeries were already present. Minor glacier and ice shelf advances have occurred since about 5000 yr B.P. A small glacier near Edmonson Point experienced an advance of about 130 m later than 700 yr B.P. In the present century, local glaciers and the Hells Gate ice shelf appear to be retreating while small lakes have slightly increased their levels. (Auth.)

46-2550
Strandline Glacier (Victoria Land, Antarctica), variation of the ice-cliff margin 1987-1988.
Baroni, C., *Società Geologica Italiana, Rome Memorie*, 1988, Vol.43, Meeting on Earth Science in Antarctica, Siena, Sep. 27-28, 1988. Proceedings, p.149-154, With Italian summary. 16 refs.
Glacier surfaces, Glacier oscillation, Glacial deposits, Measurement, Mapping, Antarctica—Terra Nova Bay.
A detailed geomorphological sketch map has been compiled on the basis of a topographic survey of the Strandline Glacier margin. Measurements made from survey stations during the field seasons 1986/87 and 1987/88 show a recession of the ice cliff of about 0.8 m. A glacier position measurement made in Dec. 1984 (Ganovex IV) was repeated in Feb. 1988, showing an ice cliff retreat of 2.9 m since that time. (Auth.)

46-2551
Image processing techniques applied to LANDSAT MSS images of Victoria Land, Antarctica.
Bianchi, R., et al, *Società Geologica Italiana, Rome. Memorie*, 1988, Vol.43, Meeting on Earth Science in Antarctica, Siena, Sep. 27-28, 1988. Proceedings, p.155-163, With Italian summary. 10 refs.
LANDSAT, Mapping, Topographic maps, Image processing, Antarctica—Victoria Land.
Preliminary results are presented of research focusing on the production of antarctic image maps in cartographic projection to be used for photointerpretation and for the compilation of thematic maps. To achieve this it was necessary to remove radiometric noise and to correct geometric distortions. Enhancement techniques were applied to the LANDSAT data in order to extract specific information. Examples of the results that can be obtained by the application of these image processing techniques to LANDSAT MSS imagery of Antarctica are also shown. (Auth.)

46-2552
Thermal regime formation of deep fresh-water bodies. [Protsessy formirovaniia termicheskogo rezhima glubokikh presnovodnykh vodoemov]
Boiarinov, P.M., et al, Leningrad, Nauka, 1991, 174p., In Russian. 198 refs.
Petrov, M.P.
Thermal regime, Lakes, Subglacial observations, Upwelling, Surface temperature, Water temperature, Temperature variations, Analysis (mathematics), Isotherms.

46-2553
Quaternary geology of Asia. [Chetvertichnaia geologiia zarubezhnol Azii]
Kriger, N.I., ed, Moscow, Nauka, 1991, 247p. (Pertinent p.100-120,150-192), In Russian with English summary and table of contents. Refs. p.225-244.
Quaternary deposits, Pleistocene, Paleoclimatology, Alluvium, Glaciation, Glacial erosion.

46-2554
Adaptability of meadow plants in the cryolithozone. [Adaptivnost' lugovykh rastenii v kriolitozone]
Denisov, G.V., et al, Novosibirsk, Nauka, 1991, 254p., In Russian with English summary and table of contents. Refs. p.238-244.
Strei'tsova, V.S.
Plants (botany), Meadow soils, Saline soils, Cryogenic soils, Grasses.

46-2555
Mechanics of deformable ice. [Mekhanika deformiruemogo l'da]
Epifanov, V.P., *Itogi nauki i tekhniki. Seriia gliatsiologiia*, 1991, Vol.8, 199p., In Russian with English summary and table of contents. Refs. passim.
Ice physics, Ice mechanics, Ice deformation, Ice acoustics, Compressive properties, Avalanche mechanics, Avalanche forecasting, Fracturing, Indicating instruments, Analysis (mathematics).

46-2556
World Ocean experiment; USSR participation in the World Ocean Circulation Experiment (WOCE). [Global'nyĭ eksperiment po tsirkuliatsii okeana; programma uchastiia SSSR v global'nom eksperimente po tsirkuliatsii okeana (VOSE)]
Kamenkovich, V.M., ed, Moscow, Mezhduvedomstvennyĭ geofizicheskiĭ komitet, AN SSSR, 1990, 131p. (Pertinent p.37-52,107-124,131), In Russian with English table of contents. Refs. passim.
Ocean currents, Oceans, Air ice water interaction, Ice cover effect, Sea ice, Heat flux, Salinity.
Descriptions of the international World Ocean Circulation Experiment program and the Soviet programs and institutes investigating general ocean circulation are presented. Pertinent topics include: structure, variability, and dynamics of the Antarctic Circumpolar Current waters; ocean-atmosphere interaction, the formation of water masses, and the role of ice in these processes; and meridional heat and salinity transfer.

46-2557
Aerosol and climate. [Aerozol' i klimat],
Kondrat'ev, K.IA., ed, Leningrad, Gidrometeoizdat, 1991, 541p. (Pertinent p.191-251), In Russian. Refs. passim.
Aerosols, Polar atmospheres, Air pollution, Optical properties, Haze, Climatic changes.

46-2558
Problems in atmospheric electricity; collected articles. [Voprosy atmosfernogo elektrichestva; sbornik statei],
Stepanenko, V.D., ed, Leningrad, Gidrometeoizdat, 1990, 187p., In Russian. For selected papers see 46-2559 through 46-2562.
Atmospheric electricity, Cloud electrification, Cloud physics, Storms, Charge transfer, Ice physics, Precipitation (meteorology).

46-2559
Electrification of convective clouds in a natural development cycle and during seeding (aerial surveys). [Elektrizatsiia konvektivnykh oblakov v estestvennom tsikle razvitiia i pri vozdeĭstviiakh (samoletnye issledovaniia)],
Gal'perin, S.M., et al, Voprosy atmosfernogo elektrichestva; sbornik statei (Problems in atmospheric electricity; collected articles). Edited by V.D.Stepanenko, et al, Leningrad, Gidrometeoizdat, 1990, p.76-102, In Russian. 67 refs.
Kashleva, L.V., Mikhaĭlovskiĭ, IU.P., Stepanenko, V.D.
Cloud electrification, Cloud physics, Precipitation (meteorology), Heat transfer, Aerial surveys, Cloud seeding, Isotherms, Statistical analysis, Ice crystal nuclei.

46-2560
Development of discharge phenomena in clouds. [Razvitie razriadnykh iavleniĭ v oblakakh],
Adzhiev, A.Kh., et al, Voprosy atmosfernogo elektrichestva; sbornik statei (Problems in atmospheric electricity; collected articles). Edited by V.D.Stepanenko, et al, Leningrad, Gidrometeoizdat, 1990, p.111-119, In Russian. 6 refs.
Cloud electrification, Cloud physics, Storms, Ice crystal nuclei.

46-2561
***Charge transfer mechanism during the interaction of* ice particles.** [Mekhanizm peredachi zariada pri vzaimodeĭstvii ledianykh chastits],
Klimin, N.N., Voprosy atmosfernogo elektrichestva; sbornik statei (Problems in atmospheric electricity; collected articles). Edited by V.D.Stepanenko, et al, Leningrad, Gidrometeoizdat, 1990, p.127-137, In Russian. 30 refs.
Cloud electrification, Cloud physics, Storms, Charge transfer, Ice physics, Ice electrical properties.

46-2562
Study of atmospheric electricity in Eastern Siberia. [Issledovanie atmosfernogo elektrichestva v Vostochnoĭ Sibiri],
Filippov, A.Kh., Voprosy atmosfernogo elektrichestva; sbornik statei (Problems in atmospheric electricity; collected articles). Edited by V.D.Stepanenko, et al, Leningrad, Gidrometeoizdat, 1990, p.176-186, In Russian. 11 refs.
Atmospheric electricity, Polar atmospheres, Mathematical models, Snowstorms, Fronts (meteorology).

46-2563
Construction guidelines for oil and gas exploration in northern Alaska.
Crory, F.E., *U.S. Army Cold Regions Research and Engineering Laboratory. Report.*, Nov. 1991, CR 91-21, 83p., Refs. p.81-83.
Environmental impact, Ice runways, Cold weather construction, Snow roads, Cold weather operation, Aircraft landing areas, Petroleum industry, Gas production, Design criteria, Tundra, Permafrost.
This report addresses the unique problems associated with oil and gas explorations in northern Alaska and provides background information on the climate and environment, including the permanently frozen ground that exists throughout the area. Information on exploration efforts in the 1940s and 1950s is also included to demonstrate what happens when summertime operations disturb the surface vegetation and thermal regime of the frozen tundra; this is the reason why such operations are no longer permitted. Separate chapters are provided on the design, construction and operation of winter trails, roads, airfields and drill pads, including a separate chapter on their abandonment. Emphasis is placed on how, why and when to perform the various tasks to successfully accomplish an exploration.

46-2564
Improved salting out extraction-preconcentration method for the determination of nitroaromatics and nitramines in water.
Miyares, P.H., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Oct. 1991, SR 91-18, 39p., ADA-245 491, 40 refs.
Jenkins, T.F.
Explosives, Water pollution, Military operation, Water content, Ground water, Laboratory techniques.
An improved salting-out extraction-preconcentration, RP-HPLC-UV protocol for the determination of nitroaromatics and nitramines in water was developed. The method involves saturating a 760-mL water sample with NaCl and extracting with acetonitrile (ACN). Collected extracts are then preconcentrated and solvent exchanged to water via a Kuderna-Danish evaporator. Analysis involves solute focusing by introducing an 1100-mL sample onto a LC-8 (7.5-cm, 3-micron) column eluted with water, MeOH and THF (70:7.27:8.15(v v v)) at 2.0 mL/min followed by UV detection at 254 nm. A direct injection RP-HPLC-UV water method was developed concurrently, employing the same separation and detection techniques. Both methods are applicable for simultaneous determination of RDX, TNB, DNB, 2,4-DNT, 2,6-DNT, 2- Am-DNT and 4-Am-DNT, and HMX (salting-out only) with reporting limits ranging from 0.006 to 0.27 micrograms/L for the salting- out method and 0.12 to 1.07 micrograms/L for the direct injection method. The salting-out extraction procedure is suitable for determination of HMX, RDX, TNT, 2,4-DNT and 2,6-DNT at concentrations below the health advisory and water quality criteria proposed by the USEPA and Oak Ridge National Laboratory.

46-2565
***One-dimensional temperature model for a snow* cover; technical documentation for SNTHERM.89.**
Jordan, R., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Oct. 1991, SR 91-16, 49p., ADA-245 493, Refs. p.46-49.
Mathematical models, Snow cover, Mass balance, Snow compaction, Computerized simulation, Fluid flow, Phase transformations, Metamorphism (snow), Frozen ground mechanics.
This report provides technical documentation for the computer code SNTHERM.89, which is a one-dimensional mass and energy balance model of snow and frozen soil. The model is structured using a simplified mixture theory and addresses coupled mass and heat flow, phase change and snow metamorphism. The underlying theory and numerical equations are presented. Included are detailed descriptions of the computation of the energy fluxes at the air/snow interface and of optional routines for estimating short- and long-wave radiation on horizontal and sloped surfaces.

46-2566
Field screening method for 2,4-Dinitrotoluene in soil.
Jenkins, T.F., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Oct. 1991, SR 91-17, 11p., ADA-245 492, 12 refs.
Walsh, M.E.
Soil pollution, Explosives, Military operation.
A simple field screening method was developed to detect the presence of 2,4-dinitrotoluene (2,4-DNT) in soil. The method involves extraction of 2,4-DNT from the soil with acetone, generation of a bluish-purple Janowsky complex by addition of potassium hydroxide and sodium sulfite, and estimation of concentration by measuring the absorbance at 570 nm with a battery-operated spectrophotometer. While the extent of color development is also somewhat dependent on the moisture content of the soil, analysts can visually detect concentrations of 2 micrograms per gram or greater in the soil. The acetone extraction step was shown to extract at least 80% of the 2,4-DNT present in a series of field contaminated soils. A 30-minute reaction time is required after addition of the reagents, and the color, once formed, is stable for at least 60 minutes after filtration. The presence of TNT, tetryl, TNB and 2,6-DNT will result in a positive interference with this method. High concentrations of copper in the soil may result in negative interference by inhibiting the formation of the Janowsky complex or by complexing with it to modify its visual absorbance characteristics.

46-2567
An analysis of the stress wave in solids (SWIS) finite element code.
Faran, K.J.L., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Nov. 1991, SR 91-21, 32p., ADA-245 921, 6 refs.
Wave propagation, Stresses, Mathematical models, Computer programs.
The Stress Wave in Solids (SWIS) finite element code is a versatile program in that it can solve problems in one, two or three spatial dimensions. Although the code assumes linear elasticity and isotropic materials, it can solve problems in regions containing up to 9 different material types. To demonstrate its utility, SWIS has been used to solve 3 classical wave propagation problems: one-dimensional longitudinal displacement, impulse along the length of a cantilevered beam and Lamb's problem. This report describes how to use SWIS by summarizing the contents of the input and output files. Discussions of damping factors, computation times and comparisons to other solutions are also included.

46-2568
***Automotive and construction* equipment for arctic use; materials and problems.**
Diemand, D., *U.S. Army Cold Regions Research and Engineering Laboratory. Technical digest*, Nov. 1991, TD 91-05, 23p., ADA-244 835, 16 refs.
Construction equipment, Cold weather operation, Cold weather performance, Cold weather construction, Motor vehicles, Temperature effects, Metals, Plastics, Brittleness, Cracking (fracturing).
The objective of this digest is to provide a discussion of the general types of problems that will be encountered in automotive and construction equipment when used in the extreme cold and to provide guidelines for overcoming them. The properties and problems of metals are discussed first, followed by a discussion of plastics and elastomers.

46-2569
Controlling the thermal regime of tunnels in severe climatic conditions. [Upravlenie teplovym rezhimom tonneleĭ v surovykh klimaticheskikh usloviiakh],
Gendler, S.G., *Transportnoe stroitel'stvo*, Nov. 1991, No.11, p.26-27, In Russian. 4 refs. For a related article see 44- 4483.
Thermal regime, Railroad tunnels, Analysis (mathematics), Cold weather operation, Maintenance, Air temperature.

46-2570
Jet-stream technology in construction. [Struinaia tekhnologiia v stroitel'stve],
Korol'kov, V.N., *Transportnoe stroitel'stvo*, Nov. 1991, No.11, p.36-39, In Russian. 4 refs.
Hydraulic jets, Cold weather construction, Foundations.

46-2571
Planetary waves and interannual ozone anomalies in polar regions.
Zhadin, E.A., *Akademiia nauk SSSR. Izvestiya. Atmospheric and oceanic physics*, Nov. 1990(Pub. June 91), 26(11), p.847-850, 22 refs. Translated from Akademiia nauk SSSR. Izvestiia. Fizika atmosfery i okeana.
Ozone, Mathematical models, Polar atmospheres, Atmospheric circulation, Temperature effects, Water temperature, Temperature variations.
The problem of ozone anomalies in the polar regions of the northern and southern hemispheres is discussed. Hypotheses are advanced to explain the ozone "hole" in Antarctica and the interannual ozone trends in the polar regions of the northern hemisphere. Data supporting a wave hypothesis of the origin of ozone anomalies and related variations in anticipated long-period variations in sea temperature are offered. Calculations of the effect of sea temperature anomalies on jetstream ozone transfer in a linear model of stationary planetary waves have demonstrated that anomalous variations in the ozone layer may be related to geographical variations of thermal streams (the Gulf Stream and Kuroshio and the El Niño phenomenon). (Auth.mod.)

46-2572
Bifurcation of the thermohaline ocean circulation and the ice ages.
Kagan, B.A., et al, *Akademiia nauk SSSR. Izvestiya. Atmospheric and oceanic physics*, Nov. 1990(Pub. June 91), 26(11), p.857-864, 5 refs. Translated from Akademiia nauk SSSR. Izvestiia. Fizika atmosfery i okeana.
Maslova, N.B., Sept, V.V.
Ocean currents, Sea water, Water temperature, Salinity, Analysis (mathematics), Air water interactions.

46-2573
***Autooscillations of the thermohaline circulation* with asymmetric ocean distribution in northern and southern hemispheres.**
Sept, V.V., *Akademiia nauk SSSR. Izvestiya. Atmospheric and oceanic physics*, Nov. 1990(Pub. June 91), 26(11), p.865-870, 5 refs. Translated from Akademiia nauk SSSR. Izvestiia. Fizika atmosfery i okeana.
Ocean currents, Sea water, Water temperature, Salinity, Mathematical models, Air ice water interaction.
The evolution of the thermohaline ocean circulation within the limits of a simple three-box model of the climatic ocean-atmosphere-glacier system is studied. When ocean distribution is asymmetric relative to the equator, the thermohaline circulation has four stable steady states. It is shown that solutions of the nonstationary equations contain autooscillations with a period of approximately 80 kyr, which causes a periodic change of the regimes of the thermohaline ocean circulation. Duration of the existence of separate circulation regimes, as well as their sequences, depend crucially on the relation of the areas of ocean and land in both hemispheres. (Auth.)

46-2574
Proceedings of the 2nd Glacier Bay Science Symposium.
Glacier Bay Science Symposium, 2nd, Glacier Bay Lodge, Glacier Bay National Park and Preserve, Gustavus, AK, Sep. 19-22, 1988. Anchorage, AK, Alaska Regional Office, National Park Service, U.S. Dept. of the Interior, 1990, 165p., Refs. passim. For selected papers see 46-2575 through 46-2585.
Milner, A.M., ed. Wood, J.D., Jr., ed.
Glaciers, Glacial deposits, Sedimentation, Deltas, Moraines, Suspended sediments, Channels (waterways), Tides, Water chemistry, Ground water, Glacier oscillations, United States—Alaska—Glacier Bay.

46-2575
Gravity, gravity-change, and other geophysical measurements in Glacier Bay National Park and Preserve.
Barnes, D.F., Glacier Bay Science Symposium, 2nd, Glacier Bay Lodge, Glacier Bay National Park and Preserve, Gustavus, AK, Sep. 19-22, 1988. Proceedings. Edited by A.M. Milner and J.D. Wood, Jr., Anchorage, AK, Alaska Regional Office, National Park Service, U.S. Dept. of the Interior, 1990, p.12-18, 30 refs.
Gravity, Gravity anomalies, Tectonics, Isostasy, Sea level, Tides, Geophysical surveys, Glacier thickness, United States—Alaska—Glacier Bay.

46-2576
Physical factors influencing stream development in Glacier Bay National Park, Alaska.
Sidle, R.C., et al, Glacier Bay Science Symposium, 2nd, Glacier Bay Lodge, Glacier Bay National Park and Preserve, Gustavus, AK, Sep. 19-22, 1988. Proceedings. Edited by A.M. Milner and J.D. Wood, Jr., Anchorage, AK, Alaska Regional Office, National Park Service, U.S. Dept. of the Interior, 1990, p.19-25, 9 refs.
Milner, A.M.
Streams, Suspended sediments, Ice erosion, Channel stabilization, Vegetation factors, United States—Alaska—Glacier Bay.

46-2577
Groundwater flow systems and geochemistry near the margin of the Burroughs Glacier.
Simpkins, W.W., et al, Glacier Bay Science Symposium, 2nd, Glacier Bay Lodge, Glacier Bay National Park and Preserve, Gustavus, AK, Sep. 19-22, 1988. Proceedings. Edited by A.M. Milner and J.D. Wood, Jr., Anchorage, AK, Alaska Regional Office, National Park Service, U.S. Dept. of the Interior, 1990, p.26-33, 22 refs.
Mickelson, D.M.
Ground water, Geochemistry, Weathering, Moraines, Glacial deposits, Meltwater, Water chemistry, United States—Alaska—Burroughs Glacier.

46-2578
Malaspina Glacier radar study: a SLAR investigation of glacial and periglacial features.
Jones, J.E., et al, Glacier Bay Science Symposium, 2nd, Glacier Bay Lodge, Glacier Bay National Park and Preserve, Gustavus, AK, Sep. 19-22, 1988. Proceedings. Edited by A.M. Milner and J.D. Wood, Jr., Anchorage, AK, Alaska Regional Office, National Park Service, U.S. Dept. of the Interior, 1990, p.34-40, 4 refs.
Molnia, B.F., Schoonmaker, J.W., Jr.
Glacier surfaces, Glacier surveys, Periglacial processes, Moraines, Bedrock, Topography, Radar photography, Side looking radar, United States—Alaska—Malaspina Glacier.

46-2579
Channel-forming processes active in Queen Inlet, Glacier Bay, Alaska.
Carlson, P.R., et al, Glacier Bay Science Symposium, 2nd, Glacier Bay Lodge, Glacier Bay National Park and Preserve, Gustavus, AK, Sep. 19-22, 1988. Proceedings. Edited by A.M. Milner and J.D. Wood, Jr., Anchorage, AK, Alaska Regional Office, National Park Service, U.S. Dept. of the Interior, 1990, p.41-46, 11 refs.
Powell, R.D., Rearic, D.M., Quinterno, P.
Channels (waterways), Suspended sediments, Glacier oscillation, Turbidity, United States—Alaska—Glacier Bay.

46-2580
Suspended sediment dynamics of glacial deltas: implications for maintenance of submarine channels.
Phillips, A.C., et al, Glacier Bay Science Symposium, 2nd, Glacier Bay Lodge, Glacier Bay National Park and Preserve, Gustavus, AK, Sep. 19-22, 1988. Proceedings. Edited by A.M. Milner and J.D. Wood, Jr., Anchorage, AK, Alaska Regional Office, National Park Service, U.S. Dept. of the Interior, 1990, p.47-49, 8 refs.
Smith, N.D.
Suspended sediments, Deltas, Channels (waterways), Tides, United States—Alaska—Queen Inlet.

46-2581
Circulation and suspended sediment dynamics in McBride Inlet, a tidewater glacial fjord.
Cowan, E.A., et al, Glacier Bay Science Symposium, 2nd, Glacier Bay Lodge, Glacier Bay National Park and Preserve, Gustavus, AK, Sep. 19-22, 1988. Proceedings. Edited by A.M. Milner and J.D. Wood, Jr., Anchorage, AK, Alaska Regional Office, National Park Service, U.S. Dept. of the Interior, 1990, p.50-55, 7 refs.
Powell, R.D.
Suspended sediments, Upwelling, Glaciers, Plankton, Meltwater, United States—Alaska—McBride Inlet.

46-2582
Iceberg-rafted debris in McBride Inlet, Glacier Bay, Alaska.
Gottler, P.F., et al, Glacier Bay Science Symposium, 2nd, Glacier Bay Lodge, Glacier Bay National Park and Preserve, Gustavus, AK, Sep. 19-22, 1988. Proceedings. Edited by A.M. Milner and J.D. Wood, Jr., Anchorage, AK, Alaska Regional Office, National Park Service, U.S. Dept. of the Interior, 1990, p.56-61, 6 refs.
Powell, R.D.
Glaciers, Ice rafting, Sedimentation, Glacial deposits, Bottom sediment, United States—Alaska—McBride Inlet.

46-2583
Effects of surging on a proglacial lake: Carroll Glacier, Wachusett Inlet.
Smith, N.D., Glacier Bay Science Symposium, 2nd, Glacier Bay Lodge, Glacier Bay National Park and Preserve, Gustavus, AK, Sep. 19-22, 1988. Proceedings. Edited by A.M. Milner and J.D. Wood, Jr., Anchorage, AK, Alaska Regional Office, National Park Service, U.S. Dept. of the Interior, 1990, p.62-66, 4 refs.
Glacier surges, Glacial deposits, Lacustrine deposits, Sedimentation, Glacial lakes, Moraines, Glacier tongues, United States—Alaska—Carroll Glacier.

46-2584
Advance of glacial tidewater fronts in Glacier Bay, Alaska.
Powell, R.D., Glacier Bay Science Symposium, 2nd, Glacier Bay Lodge, Glacier Bay National Park and Preserve, Gustavus, AK, Sep. 19-22, 1988. Proceedings. Edited by A.M. Milner and J.D. Wood, Jr., Anchorage, AK, Alaska Regional Office, National Park Service, U.S. Dept. of the Interior, 1990, p.67-73, 20 refs.
Glaciers, Glacial deposits, Sedimentation, Deltas, United States—Alaska—Glacier Bay.

46-2585
Effect of ecosystem succession on soil and streamwater chemistry in Glacier Bay.
Stottlemyer, R., Glacier Bay Science Symposium, 2nd, Glacier Bay Lodge, Glacier Bay National Park and Preserve, Gustavus, AK, Sep. 19-22, 1988. Proceedings. Edited by A.M. Milner and J.D. Wood, Jr., Anchorage, AK, Alaska Regional Office, National Park Service, U.S. Dept. of the Interior, 1990, p.140-146, 12 refs.
Soil chemistry, Water chemistry, Watersheds, Ecosystems, Glacial deposits, United States—Alaska—Glacier Bay.

46-2586
Applied avalanche studies. [Prikladnoe lavinovedenie].
Losev, K.S., et al, *Itogi nauki i tekhniki. Seriia gliatsiologiia*, 1991, Vol.9, Moscow, VINITI, 1991, 171p., In Russian. 81 refs.
Bozhinskiĭ, A.N., Grakovich, V.F.
Avalanches, Avalanche forecasting, Countermeasures, Avalanche mechanics, Design, Analysis (mathematics).

46-2587
High performance concretes; a state-of-the-art report.
Zia, P., et al, *National Research Council. Strategic Highway Research Program, Washington, D.C. Report*, 1991, SHRP-C-FR-91-103, Var. p., Refs. p.R-1-R-26
Leming, M.L., Ahmad, S.H.
Concrete pavements, Concrete strength, Concrete durability, Frost resistance, Analysis (mathematics), Freeze thaw tests, Water cement ratio

46-2588
Summary report on asphalt properties and relationship to pavement performance: literature review.
Finn, F.N., et al, *National Research Council. Strategic Highway Research Program, Washington, D.C. Report*, 1990, SHRP-A/IR-90-015, Var. p., Refs. p.6.1-6.19.
Yapp, M.T., Coplantz, J.S., Durrani, A.Z.
Bituminous concretes, Concrete pavements, Concrete durability, Concrete strength, Frost resistance, Cold weather performance.

46-2589
Cool thermal storage by vacuum freezing of water with constant volume rate of sublimation.
Yeh, H.M., et al, *Energy conversion and management*, Jan. 1992, 33(1), p.51-57, 9 refs.
Cheng, C.Y.
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Aircraft icing, Ice detection, Safety

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Aircraft icing, Ice forecasting, Ice accretion, Air flow, Ice surface, Performance, Computerized simulation, Ice air interface.

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Extraterrestrial ice, Simulation, Radiation absorption, Ice electrical properties, Electrical resistivity, Electric charge, Scanning electron microscopy, Electrical measurement, Microstructure.

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Oun, I.A.A.
Pile load tests, Soil mechanics, Creep, Dynamic loads, Design, Frozen ground settling, Bearing strength.

46-2594
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Mikhaliuk, A.V., et al, *Soil mechanics and foundation engineering*, Nov. 1991, 28(3), p.116-120, Translated from Osnovaniia, fundamenty i mekhanika gruntov, May-June, 1991. 10 refs.
Pisarev, IU.A., Tokarchuk, A.V., Demchenko, L.A.
Frozen ground compression, Frozen ground mechanics, Dynamic loads, Soil tests, Geocryology, Explosion effects, Ice melting, Impact tests.

46-2595
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Frozen ground strength, Penetration tests, Geocryology, Soil tests, Static stability, Frozen ground mechanics, Cold weather construction, Bearing strength.

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46-2597
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46-2598
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46-2599
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Forest ecosystems, Subpolar regions, Pollution, Environmental impact, Natural resources, Economic development, Tundra.

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Air water interactions, Radiation balance, Mathematical models, Advection, Air ice water interaction, Polar atmospheres, Sea ice, Statistical analysis, Climate.

46-2601
Laboratory experiment on oil weathering under arctic conditions.
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Meehan, T.M., Myers, J.C.
Oil spills, Ice cover effect, Weathering, Decomposition, Evaporation, Chemical properties.

46-2602
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Matthews, J.B.
Ocean currents, Drift stations, Oil spills, Wind factors, Sea ice, Beaufort Sea.

46-2603
Laboratory studies of oil spill behavior in broken ice fields.
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Oil spills, Ice cover effect, Drift, Floating ice, Analysis (mathematics).

46-2604
Long-term movement of satellite-tracked buoys in the Beaufort Sea—an interim report.
Murphy, D.L., et al. *U.S. Coast Guard Research and Development Center. Report*, June 1981, 26p. + appends., 13 refs.
Tebeau, P.A., Lissauer, I.M.
Ocean currents, Drift stations, Oil spills, Ice edge, Wind factors, Beaufort Sea.

46-2605
Cold Weather Materiel Requirements Conference after action report.
U.S. Army Combined Arms Center, Fort Leavenworth, KS, Dec. 9, 1976, 14p. + appends.
Military equipment, Cold weather performance, Cold weather survival, Clothing.

46-2606
Summary report on low temperature and thermal fatigue cracking.
Vinson, T.S., et al. *National Research Council. Strategic Highway Research Program. Washington, D.C. Report*, June 1989, SHRP-A/IR-90-001, MP 3022, 83p., 68 refs.
Janoo, V.C., Haas, R.C.G.
Bituminous concretes, Concrete pavements, Concrete freezing, Concrete strength, Low temperature tests, Cold stress, Thermal stresses, Cracking (fracturing), Fatigue (materials).
Cracking of asphalt concrete pavements owing to cold temperatures or temperature cycling can occur in many regions of the United States. Cracking that results from cold temperatures generally is referred to as low temperature cracking, cracking that results from thermal cycling generally is referred to as thermal fatigue cracking. Thermal cracks permit the ingress of water, which may result in a depression at the crack because of the pumping of support materials. During the winter months, deicing solutions can enter the cracks and cause localized thawing of the base and a depression at the crack. Water entering the crack also may freeze, resulting in the formation of an ice lens, which can produce upward lipping at the crack edge. All of these effects result in poor ride quality and reduction of pavement life. Four test systems/methods warrant further consideration in a laboratory test program, as follows: Direct Tension-Constant Rate of Extension test, Thermal Stress Restrained Specimen test, C*-Line Integral test and Coefficient of Thermal Expansion and Contraction test. A test program is identified which should be conducted to provide a preliminary evaluation of the availability of selected test systems/methods (1) for standardization, and (2) to provide input parameters to mechanistic models for low temperature and thermal fatigue cracking.

46-2607
Designing small-boat harbors for ice conditions.
U.S. Army Cold Regions Research and Engineering Laboratory, MP 3079, Hanover, NH, [1985], 21p.
Ports, Ice control, Ice conditions.

46-2608
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Road icing, Road maintenance, Chemical ice prevention, Salting, Ice removal, Cost analysis, Environmental impact.

46-2609
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Kalliosaari, S.
Sea ice distribution, Ice cover thickness, Ice conditions, Fast ice, Freezeup, Ice breakup, Ice navigation, Snow depth, Finland.

46-2610
Duration of the ice season and statistics of fast ice thickness along Lake Saimaa 1986-1991. [Jäätalven kestoaika ja kiintojään paksuustilastoja Saimaalla 1986-1991].
Seinä, A., *Finnish marine research*, 1991, No.259, p.63-68, In Finnish and English.
Lake ice, Ice conditions, Ice cover thickness, Fast ice, Freezeup, Ice breakup, Finland.

46-2611
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Aircraft icing, Ice forecasting.

46-2612
Opportunities and priorities in arctic geoscience.
National Research Council. Polar Research Board, Washington, D.C., National Academy Press, 1991, 67p., Refs. p.61-67.
Research projects, Bottom sediment, Marine deposits, Paleoclimatology, International cooperation, Tectonics, Exploration.

46-2613
RIM: river ice management.
U.S. Army Cold Regions Research and Engineering Laboratory, MP 3078, Hanover, NH, Sep. 1981, 33p.
River ice, Ice control, Ice conditions, Research projects, Transportation.

46-2614
Mechanical strength of ice grown from an impure melt.
Timco, G.W., et al. *National Research Council Canada. Division of Mechanical Engineering Laboratory technical report*, Aug. 1979, LTR-LT-103, 22p. + figs., 14 refs.
Martin, R.A.
Ice growth, Ice strength, Doped ice, Impurities, Chemical properties.

46-2615
On the origin of the water aspiration in a freezing dispersed medium.
Vignes-Adler, M., *Journal of colloid and interface science*, June 1977, 60(1), p.162-171, 17 refs.
Ice water interface, Ice formation, Freezing front, Capillarity, Water films, Hydrodynamics, Water pressure, Analysis (mathematics).

46-2616
Measurements of ClO and O3 from 21N to 61N in the lower stratosphere during February 1988: implications for heterogeneous chemistry.
King, J.C., et al. *Geophysical research letters*, Dec. 1991, 18(12), p.2273-2276, 18 refs.
Atmospheric composition, Chemical composition, Aerial surveys, Ozone.

46-2617
Recent trends in stratospheric total ozone: implications of dynamical and El Chichon perturbations.
Chandra, S., et al. *Geophysical research letters*, Dec. 1991, 18(12), p.2277-2280, 22 refs.
Stolarski, R.S.
Ozone, Volcanoes.
The recently reprocessed Nimbus-7 TOMS total ozone data from 1979 to 1989 are analyzed to assess the global impact of the El Chichon volcanic eruption on stratospheric total ozone. An apparent decrease in total ozone of 5 to 6% occurred during the winter of 1982-83 following the eruption of El Chichon. A regression analysis of total ozone with the equatorial zonal wind at 30 mb indicates that response to the quasi-biennial oscillation can explain much of the observed ozone anomaly, and that the total ozone decrease which can be attributed to El Chichon is at most 2 to 4%. This study also suggests that the interannual variability caused by the quasi-biennial oscillation and planetary wave activity may introduce apparent seasonal trends in total ozone and temperature in the lower stratosphere, particularly if the data record is not very long. Such trends may affect the assessment of total ozone changes caused by chemical perturbations. The data range for this trend analysis extends from 60N through 60S. (Auth.)

46-2618
Portable CTD system for use in polar environments.
O'Farrell, S.P., et al. *Cold regions science and technology*, Nov. 1991, 20(1), p.1-9, 13 refs.
Squire, V.A., Moore, S.C., Owen, T.R.E.
Sea water, Sea ice, Subglacial observations, Measuring instruments, Design, Water temperature, Sounding, Salinity, Portable equipment, Oceanography, Ice water interface.

46-2619
Wave-induced iceberg motion.
Lever, J.H., et al. *Cold regions science and technology*, Nov. 1991, 20(1), MP 3023, p.11-23, 16 refs.
Klein, K., Mitchell, D., Diemand, D.
Icebergs, Hydrodynamics, Water waves, Ice water interface, Drift, Velocity measurement, Stability, Data processing, Design criteria.
This paper describes the results of a three-year field study to measure the wave-induced motion of icebergs in order to examine how closely iceberg velocities, derived using wave-tank tests, reflect those of irregularly shaped full-scale icebergs. Self-contained motion-monitoring packages were deployed on icebergs in the Labrador Sea and on the Grand Banks, from which 19 data sets of wave-induced iceberg motion were obtained. These are the only available data describing the wave-induced motion of full-scale icebergs in six degrees-of-freedom. For comparison with laboratory results, computed normalized significant surge and heave iceberg velocities were computed and plotted against normalized peak wavelength. This demonstrated that velocities based on wave-tank study of four regularly shaped model icebergs do reflect the range of variation in iceberg motion attributable to random shape. The authors conclude that iceberg significant velocities are random quantities for a given size iceberg in a given sea state, and that a gamma probability density, fitted to wave-tank results, is suitable for describing their variations.

46-2620
Laboratory measurements of growth in thin ice and flooded ice.
Lozowski, E.P., et al. *Cold regions science and technology*, Nov. 1991, 20(1), p.25-37, 12 refs.
Jones, S.J., Hill, B.
Ice sheets, Ice temperature, Ice water interface, Ice growth, Ice cover thickness, Flooding, Forecasting, Ice (construction material), Heat transfer coefficient.

46-2621
Experimental investigation of heat transfer through wind-permeable clothing.
Kind, R.J., et al, *Cold regions science and technology*, Nov. 1991, 20(1), p.39-49, 7 refs.
Jenkins, J.M., Seddigh, F.
Clothing, Cold weather performance, Heat loss, Heat transfer, Permeability, Wind factors, Thermal analysis, Wind tunnels.

46-2622
Response of floating ice to a moving, vibrating load.
Duffy, D.G., *Cold regions science and technology*, Nov. 1991, 20(1), p.51-64, 28 refs.
Floating ice, Sea ice, Wave propagation, Dynamic loads, Vibration, Resonance, Stability, Ice runways, Analysis (mathematics).

46-2623
Three-dimensional numerical simulation of snowdrift.
Uematsu, T., et al, *Cold regions science and technology*, Nov. 1991, 20(1), p.65-73, 17 refs.
Snowdrifts, Wind factors, Blowing snow, Snow accumulation, Air flow, Topographic effects, Simulation, Sublimation, Snow fences, Snow cover stability.

46-2624
Why ice-age ice is sometimes "soft".
Paterson, W.S.B., *Cold regions science and technology*, Nov. 1991, 20(1), p.75-98, Refs. p.95-98.
Pleistocene, Strains, Ice composition, Drill core analysis, Ice sheets, Ice deformation, Ice strength, Mechanical properties, Impurities, Viscosity.
Data on the mechanical properties, texture, fabric, and impurity content of ice deposited during the last glaciation are reviewed. The conclusions are: (1) chloride and possibly sulphate ions, in concentrations high relative to those in Holocene ice, impede grain-boundary migration and grain growth so that the crystals remain small. (2) Such ice, in shear parallel to the ice-sheet bed, develops a strong, near-vertical, single- maximum fabric. (3) This fabric favors further deformation and this, in turn, further strengthens the fabric and keeps the crystals small. This is why the strain rate in ice-age ice, in simple shear, is some 2.5 times that in Holocene ice at the same stress and temperature. (4) Ice-age ice under other stress systems, such as ice in roughly the upper 60% of the ice thickness, in bedrock hollows, at a stationary ice divide, in ice streams and in ice shelves, will not have enhanced flow. (5) An anisotropic flow relation must be used for detailed modelling of polar ice sheets. Sites for ice core samples include Vostok Station, Byrd Station and Law Dome in Antarctica. (Auth. mod.)

46-2625
Renormalized group model for the fragmentation of ice.
Parsons, B.L., *Cold regions science and technology*, Nov. 1991, 20(1), p.99-101, 12 refs.
Ice mechanics, Ice strength, Cracking (fracturing), Ice breaking, Forecasting, Brittleness, Analysis (mathematics), Accuracy.

46-2626
Chemical basis for the electrical stratigraphy of ice.
Moore, J.C., et al, *Journal of geophysical research*, Feb. 10, 1992, 97(B2), p.1887-1896, 28 refs.
Wolff, E.W., Clausen, H.B., Hammer, C.U.
Drill core analysis, Ice electrical properties, Ice cores, Stratigraphy, Impurities, Chemical properties, Electrical resistivity, Electrical measurement, Ice salinity.
Antarctic and Greenland ice core samples were studied using two different stratigraphic electrical techniques. The electrical conductivity measurement (ECM) technique is a d-c method, while dielectric profiling (DEP) is an a-c method. It was found that ECM responds only to acid, even in large excess of neutral salt concentrations. DEP responds to both acid and salt content of the ice. Acids may be giving rise to conduction through an increase in the number of ionization defects, or through a network of liquid veins between ice grains. Salts on the other hand appear to give rise to Bjerrum defects, which are bound charges and cannot provide a d-c current, but do produce a dielectric a-c conductivity. The two methods can be used together to give a rapid prediction of both acid and salt content of cores. This may be of particular use in Wisconsin-age ice from Greenland, but can generally be used to define parts of cores worthy of detailed chemical study. (Auth.)

46-2627
Thermal conductivity measurements of depth hoar.
Sturm, M., et al, *Journal of geophysical research*, Feb. 10, 1992, 97(B2), MP 3024, p.2129-2139, 52 refs.
Johnson, J.B.
Depth hoar, Snow thermal properties, Thermal conductivity, Metamorphism (snow), Vapor diffusion, Snow cover structure, Temperature measurement, Probes, Temperature effects, Snow physics.
The effective thermal conductivity of snow (k(eff)), which includes latent heat transfer due to vapor diffusion, was measured during three winters in Fairbanks, AK. In 1986-1987, k(eff) of several layers of snow was monitored in detail as the snow metamorphosed into depth hoar. Measurements were made using a needle probe with an estimated accuracy of +/-8%; k(eff) was found to decrease and then increase as the snow passed from new snow through several distinct stages of depth hoar. For depth hoar, k(eff) ranged from 0.026 to 0.105, with an average value of 0.063 W m^{-1}K. This is one half to one fourth the value suggested by most studies for snow of similar density. For depth hoar of a given type, k(eff) can be represented as a linear function of temperature between 0 and -20 C but requires a nonlinear function for the range from 0 to -196 C. At -196 C the thermal conductivity of depth hoar approached that of still air, suggesting that conduction through the ice skeleton of the snow was limited and that the increase in k(eff) at temperature near 0 C is the result of the strong temperature dependence of water vapor density. This conclusion is consistent with the nature of the ice bonds in depth hoar, which are thin and relatively few in number.

46-2628
Comparison of GCM simulations of arctic climate.
Walsh, J.E., et al, *Geophysical research letters*, Jan. 3, 1992, 19(1), p.29-32, 13 refs.
Crane, R.G.
Climate, Models, Sea ice.

46-2629
Meteorological transport of continental soot to Antarctica.
Murphey, J.B., et al, *Geophysical research letters*, Jan. 3, 1992, 19(1), MP 3025, p.33-36, 23 refs.
Hogan, A.W.
Aerosols, Atmospheric circulation, Atmospheric composition, Air pollution, Antarctica—Ross Island.
An impactor/concentrator/microdensitometer (ICM) instrument system has been constructed and calibrated. This system is sufficiently sensitive to measure the black (carbon soot) component of antarctic aerosol with a sampling time of four hours. The impactor concentrator was exposed to antarctic air at Ross I. in Sep. 1987. Microdensitometer analysis of the collected specimens indicates that the maximum black aerosol concentration was observed concurrently with the arrival of the warmest air accompanying a cyclonic storm. This is similar to the concurrence of continental radon and lead isotopes with warm advection, measured on the antarctic coast in 1986. It is possible that continental soot can be transported to the antarctic coast several times each year by this mechanism. (Auth.)

46-2630
Implications of recent total atmospheric ozone measurements for biologically active ultraviolet radiation reaching the earth's surface.
Madronich, S., *Geophysical research letters*, Jan. 3, 1992, 19(1), p.37-40, 24 refs.
Ozone, Ultraviolet radiation.
Recent satellite measurements of total atmospheric ozone were analyzed to deduce the changes in biologically active ultraviolet (UV) radiation reaching the Earth's surface from 1979 to 1989. The calculated increases are on average substantially larger than earlier estimates, particularly at mid- and high latitudes of both hemispheres. Charts show trends in daily global effective UV radiation dose for DNA damage from 85S to 85N, and a table shows ozone trends for RB meter, erythema induction, plant damage, and DNA damage over the same range of latitudes. (Auth. mod.)

46-2631
Laboratory measurements of direct ozone loss on ice and doped-ice surfaces.
Dlugokencky, E.J., et al, *Geophysical research letters*, Jan. 3, 1992, 19(1), p.41-44, 17 refs.
Ravishankara, A.R.
Ozone, Ice, Doped ice.

46-2632
Application of remote sensing to topographic maps of polar areas.
Dzierzek, J., et al, *Polish polar research*, 1991, 12(2), p.149-160, With Polish summary. 15 refs., 11 map refs.
Remote sensing, Topographic maps, Polar regions.

46-2633
Metal contents in soils of Kaffiöyra, Spitsbergen.
Plichta, W., et al, *Polish polar research*, 1991, 12(2), p.183-193, With Polish summary. 27 refs.
Kuczyńska, I.
Tundra, Soil composition, Geocryology, Metals, Spitsbergen.

46-2634
Profile distribution of metals in gelic cambisols of Kaffiöyra, Spitsbergen.
Plichta, W., et al, *Polish polar research*, 1991, 12(2), p.195-201, With Polish summary. 17 refs.
Kuczyńska, I., Sapek, A.
Tundra, Soil composition, Geocryology, Metals, Spitsbergen.

46-2635
Action of shallow tundra lakes on thickness of active layer in Oscar II Land, Spitsbergen.
Pietrucień, C., et al, *Polish polar research*, 1991, 12(2), p.203-213, With Polish summary. 19 refs.
Skowron, R.
Tundra, Lakes, Active layer, Ground thawing, Spitsbergen.

46-2636
Mineralogical description of sandur deposits from the forefield of the Renard Glacier (Wedel Jarlsberg Land, Spitsbergen) on the ground of heavy minerals.
Chlebowski, R., *Polish polar research*, 1991, 12(2), p.215-222, With Polish summary. 8 refs.
Minerals, Sediments, Moraines, Spitsbergen—Renard Glacier.

46-2637
Snow depth at the Hornsund Station, Spitsbergen in 1978-1986.
Mietus, M., *Polish polar research*, 1991, 12(2), p.223-228, With Polish summary. 8 refs.
Snow depth, Ablation, Spitsbergen—Hornsund Station.

46-2638
Cyclical closed-system freeze-thaw permeability testing of soil liner and cover materials.
Wong, L.C., et al, *Canadian geotechnical journal*, Dec. 1991, 28(6), p.784-793, With French summary. 26 refs.
Haug, M.D.
Soil aggregates, Soil mechanics, Permeability, Linings, Freeze thaw tests, Frost protection, Hygroscopic water, Soil tests, Porosity, Soil stabilization.

46-2639
Behavior of a clay membrane of an aeration pond in a cold region. [Comportement de la membrane d'argile d'un étang aéré en région froide].
Leroueil, S., et al, *Canadian geotechnical journal*, Dec. 1991, 28(6), p.818-828, In French with English summary. 2 refs.
Savard, Y., Bouchard, R.
Waste treatment, Cold weather performance, Ponds, Linings, Frost action, Frost protection, Clays, Soil tests, Frozen ground mechanics, Deformation.

46-2640
Discrete ice lens theory for frost heave in soils.
Nixon, J.F., *Canadian geotechnical journal*, Dec. 1991, 28(6), p.843-859, With French summary. 39 refs.
Soil freezing, Frost heave, Ice lenses, Soil water migration, Freezing front, Phase transformations, Soil temperature, Frost forecasting, Analysis (mathematics).

46-2641
Ice rubble attenuation of ice loads on arctic offshore structures.
Wong, T.T., et al, *Canadian geotechnical journal*, Dec. 1991, 28(6), p.881-895, With French summary. 45 refs.
Morgenstern, N.R., Sego, D.C.
Sea ice, Attenuation, Offshore structures, Ice mechanics, Ice solid interface, Ice loads, Grounded ice, Ice pileup, Pressure ridges, Stress concentration, Analysis (mathematics).

46-2642
Centrifuge modelling of ice and brittle materials.
Palmer, A.C., *Canadian geotechnical journal*, Dec. 1991, 28(6), p.896-898, With French summary. 13 refs.
Ice models, Mechanical tests, Ice breaking, Cracking (fracturing), Ice deformation, Brittleness, Crack propagation, Ice mechanics.

46-2643
Freezing and thawing indices in northern Canada.
McCormick, G., *Canadian geotechnical journal*, Dec. 1991, 28(6), p.899-903, With French summary. 9 refs.
Air temperature, Seasonal freeze thaw, Freezing indexes, Frost forecasting, Soil freezing, Frost penetration, Design criteria, Periodic variations, Degree days.

46-2644
Proceedings.
International Workshop on Physics and Mechanics of Cometary Materials, Munster, Westfalia, FRG, Oct. 9-11, 1989, Noordwijk, Netherlands, European Space Agency, Dec. 1989, 246p., ESA SP-302, Refs. passim.
For individual papers see 44-2800, 44- 2801 and 46-2645 through 46-2656.
Hunt, J., ed, Guyenne, T.D., ed.
Extraterrestrial ice, Porous materials, Simulation, Ice sublimation, Insolation, Vapor diffusion, Thermal diffusion, Mechanical tests, Meetings, Ice thermal properties, Surface properties.

46-2645
Physical processes in cometary ices inferred from laboratory studies.
Klinger, J., International Workshop on Physics and Mechanics of Cometary Materials, Munster, Westfalia, FRG, Oct. 9-11, 1989. Proceedings. Edited by J.Hunt and T.D. Guyenne, Noordwijk, Netherlands, European Space Agency, Dec. 1989, p.55-63, ESA SP-302, 79 refs.
Extraterrestrial ice, Simulation, Ice physics, Ice composition, Clathrates, Hydrates, Ice models, Physical properties.

46-2646
Laboratory studies of cometary ice analogues.
Schmitt, B., et al, International Workshop on Physics and Mechanics of Cometary Materials, Munster, Westfalia, FRG, Oct. 9-11, 1989. Proceedings. Edited by J.Hunt and T.D. Guyenne, Noordwijk, Netherlands, European Space Agency, Dec. 1989, p.65-69, ESA SP-302, 9 refs.
Extraterrestrial ice, Simulation, Clathrates, Hydrates, Ice formation, Chemical composition.

46-2647
Thermal conductivities and diffusivities of porous ice samples at low pressures and temperatures and possible modes of heat transfer in near surface layers of comets.
Spohn, T., et al, International Workshop on Physics and Mechanics of Cometary Materials, Munster, Westfalia, FRG, Oct. 9-11, 1989. Proceedings. Edited by J.Hunt and T.D. Guyenne, Noordwijk, Netherlands, European Space Agency, Dec. 1989, p.77-81, ESA SP-302, 11 refs.
Seiferlin, K., Benkhoff, J.
Extraterrestrial ice, Simulation, Porous materials, Thermal conductivity, Ice thermal properties, Temperature measurement, Thermal diffusion.

46-2648
Stable isotope studies of cometary analogue materials.
Franchi, I.A., et al, International Workshop on Physics and Mechanics of Cometary Materials, Munster, Westfalia, FRG, Oct. 9-11, 1989. Proceedings. Edited by J.Hunt and T.D. Guyenne, Noordwijk, Netherlands, European Space Agency, Dec. 1989, p.89-92, ESA SP-302, 15 refs.
Extraterrestrial ice, Simulation, Carbon dioxide, Isotope analysis, Freeze thaw cycles, Preserving, Sampling, Laboratory techniques.

46-2649
Crustal strength of different model comet materials.
Kochan, H., et al, International Workshop on Physics and Mechanics of Cometary Materials, Munster, Westfalia, FRG, Oct. 9-11, 1989. Proceedings. Edited by J.Hunt and T.D. Guyenne, Noordwijk, Netherlands, European Space Agency, Dec. 1989, p.115-119, ESA SP-302, 13 refs.
Extraterrestrial ice, Simulation, Insolation, Porous materials, Hardness tests, Surface properties.

46-2650
Simulation of radar and radiometer signals remote sensing of cometary surface and subsurface structures.
Edenhofer, P., et al, International Workshop on Physics and Mechanics of Cometary Materials, Munster, Westfalia, FRG, Oct. 9-11, 1989. Proceedings. Edited by J.Hunt and T.D. Guyenne, Noordwijk, Netherlands, European Space Agency, Dec. 1989, p.129-138, ESA SP-302, 18 refs.
Noll, J.
Extraterrestrial ice, Simulation, Radar echoes, Radiometry, Remote sensing, Backscattering, Subsurface structures, Dielectric properties, Microwaves.

46-2651
Compressive strength of synthetic comet nucleus samples.
Jessberger, H.L., et al, International Workshop on Physics and Mechanics of Cometary Materials, Munster, Westfalia, FRG, Oct. 9-11, 1989. Proceedings. Edited by J.Hunt and T.D. Guyenne, Noordwijk, Netherlands, European Space Agency, Dec. 1989, p.141-146, ESA SP-302, 5 refs.
Kotthaus, M.
Extraterrestrial ice, Simulation, Sampling, Compressive properties, Mechanical tests, Porous materials, Laboratory techniques.

46-2652
Laboratory techniques for the characterisation of snow structures.
Good, W., International Workshop on Physics and Mechanics of Cometary Materials, Munster, Westfalia, FRG, Oct. 9-11, 1989. Proceedings. Edited by J.Hunt and T.D. Guyenne, Noordwijk, Netherlands, European Space Agency, Dec. 1989, p.147-151, ESA SP-302, 34 refs.
Snow composition, Snow crystal structure, Sampling, Chemical analysis, Laboratory techniques, Image processing, Porous materials, Thin sections.

46-2653
CO2 depth profiles in cometary model substances of KOSI.
Hsiung, P., et al, International Workshop on Physics and Mechanics of Cometary Materials, Munster, Westfalia, FRG, Oct. 9-11, 1989. Proceedings. Edited by J.Hunt and T.D. Guyenne, Noordwijk, Netherlands, European Space Agency, Dec. 1989, p.191-196, ESA SP-302, 16 refs.
Roessler, K.
Extraterrestrial ice, Simulation, Insolation, Ice sublimation, Surface temperature, Vapor diffusion, Temperature distribution, Heat transfer, Carbon dioxide.

46-2654
Possible triggering of particle emission by mechanical stress and penetration of sublimating ice-dust surfaces.
Kohl, H., et al, International Workshop on Physics and Mechanics of Cometary Materials, Munster, Westfalia, FRG, Oct. 9-11, 1989. Proceedings. Edited by J.Hunt and T.D. Guyenne, Noordwijk, Netherlands, European Space Agency, Dec. 1989, p.201-203, ESA SP-302, 14 refs.
Extraterrestrial ice, Ice sublimation, Dust, Sampling, Simulation, Stresses, Particles, Stability, Porous materials.

46-2655
Gas diffusion in a cometary crust.
Kömle, N.I., et al, International Workshop on Physics and Mechanics of Cometary Materials, Munster, Westfalia, FRG, Oct. 9-11, 1989. Proceedings. Edited by J.Hunt and T.D. Guyenne, Noordwijk, Netherlands, European Space Agency, Dec. 1989, p.205-208, ESA SP-302, 5 refs.
Banaszewskiewicz, M., Steiner, G.
Extraterrestrial ice, Simulation, Ice sublimation, Dust, Vapor diffusion, Surface properties, Analysis (mathematics), Porous materials, Insolation.

46-2656
Dynamics of crust formation and dust emission of comet nucleus analogues under insolation.
Thiel, K., et al, International Workshop on Physics and Mechanics of Cometary Materials, Munster, Westfalia, FRG, Oct. 9-11, 1989. Proceedings. Edited by J.Hunt and T.D. Guyenne, Noordwijk, Netherlands, European Space Agency, Dec. 1989, p.221-225, ESA SP-302, 7 refs.
Extraterrestrial ice, Simulation, Insolation, Ice sublimation, Vapor diffusion, Dust, Surface structure, Porous materials.

46-2657
Beta heating driven deuterium-tritium ice redistribution, modeling studies.
Martin, A.J., et al, *Journal of vacuum science & technology A*, May-June 1989, 7(3)Pt.1, p.1157-1160, 6 refs.
Simms, R.J., Wineberg, S.B.
Ice physics, Cryogenics, Mass transfer, Radiation absorption, Ice vapor interface, Thermal conductivity, Low temperature research, Analysis (mathematics).

46-2658
Water on Ni(110): resolution of monolayer, bilayer, and ice layers by thermal desorption, (delta)phi, and associated absolute coverages.
Griffiths, K., et al, *Journal of vacuum science & technology A*, May-June 1989, 7(3)Pt.2, p.2001-2004, 9 refs.
Memmert, U., Callen, B.W., Norton, P.R.
Ice solid interface, Deuterium oxide ice, Ice physics, Vacuum freezing, Adsorption, Metals, Water temperature, Layers, Temperature effects, Surface properties.

46-2659
Glaciers and glacial morphology at Terra Nova Bay: an opportunity for significant studies on environmental and climatic global changes.
Orombelli, G., *Società Geologica Italiana, Rome. Memorie*, 1991, Vol.46, Meeting on Earth Science Investigations in Antarctica, Siena, Oct. 4-6, 1989. Proceedings, p.9-16, With Italian summary. 24 refs.
Paleoclimatology, Glacier oscillation, Glacial geology, Subglacial observations, Pleistocene, Antarctica—Terra Nova Bay.
Glacio-geological studies in the Italian Antarctic Program started at Terra Nova Bay during the field season 1985-86. They concerned the reconstruction of the East Antarctic Ice Sheet in this area during the Cenozoic maximum extent and during the last glacial maximum, the Late Pleistocene advances and the deglaciation history, the coastal emergence and glacier fluctuations during the Holocene. The studies included mass balance measurements and topographic surveys of glaciers near the Italian station, geochemical analysis, geophysical investigations and analysis of satellite imagery. (Auth. mod.)

46-2660
Stable isotopes in antarctic ice: glaciological implications.
Souchez, R.A., *Società Geologica Italiana, Rome. Memorie*, 1991, Vol.46, Meeting on Earth Science Investigations in Antarctica, Siena, Oct. 4-6, 1989. Proceedings, p.17-24, With Italian summary. 15 refs.
Isotopes, Sea water freezing, Ice water interface, Glacier ice, Ice shelves.
Glacier and ice shelf dynamics are dependent on basal conditions. These conditions can be appraised by a co-isotopic study, both in deltaD and deltaO-18, of basal ice. The ice, either of continental or marine origin, can be sampled in selected sites where, due to special dynamic situations, it is brought to the surface, or in deep ice cores. Not only can different types of basal ice be distinguished by their specific isotopic signature, but the origin of basal waters and the freezing rates for ice due to water freezing can be determined in favorable circumstances by the isotopic method. (Auth.)

46-2661
Polar glacier margin and debris features.
Chinn, T.J., *Società Geologica Italiana, Rome. Memorie*, 1991, Vol.46, Meeting on Earth Science Investigations in Antarctica, Siena, Oct. 4-6, 1989. Proceedings, p.25-44, With Italian summary. Refs. p.43-44.
Moraines, Glacier surfaces, Glacial deposits, Glacier flow, Glacier surveys, Ice deformation, Polar regions.
Polar or dry-based glaciers display a variety of margin forms, ranging from low-angled ramps through dome shapes to ice cliffs near 20 m in height. Common to all of these forms is a three-part structural sequence of white glacier ice, terminating at an inner moraine, which is surrounded by an outer apron structure. The forms and behavior of cold-glacier margins result from the effects of the internal ice regime zones and the fact that basal ice is frozen to the ground. Where the ice thins to about 20 m around the glacier edges, the upper semi-rigid zone becomes grounded. Basal debris is upwarped against this obstructing ice to appear at the surface as a shear moraine. Where the glacier carries a significant debris load, the insulating effect of this cover profoundly modifies the basic margin forms by eliminating ablation beyond the shear moraine. Two mechanisms for entraining large volumes of debris into polar glaciers are described.

46-2662
Oxygen isotopic composition of ice samples from the Hells Gate and Backstairs Passage ice shelves (Victoria Land, Antarctica): evidence of bottom freezing.
Baroni, C., et al, *Società Geologica Italiana, Rome. Memorie*, 1991, Vol.46, Meeting on Earth Science Investigations in Antarctica, Siena, Oct. 4-6, 1989. Proceedings, p.45-48, With Italian summary. 12 refs.
Stenni, B., Iacumin, P.
Oxygen isotopes, Glacier ice, Ice shelves, Sea ice, Ice composition, Antarctica—Hells Gate, Antarctica—Backstairs Passage Glacier.
Sixty-five samples from the Hells Gate and Backstairs Passage ice shelves have been studied for their oxygen isotopic composition. The deltaO-18 values obtained from seawater edge ice and ice beneath dirt cones range from -0.80 to +2.66 per mill, suggesting that the origin of this ice is essentially from seawater freezing. Ice samples from the upper section of dirt cones show deltaO-18 values from -12.68 to -6.15 per mill, which are intermediate between those of seawater ice and continental ice. These values are probably explained by the mixing of water from the melting of the snowdrift ice capping the cones, and the seawater ice forming their main body. The ice core of the moraine of Corner Glacier, further inland, shows deltaO-18 values from -31.81 to -26.40, in agreement with a continental origin of the ice. This ice is clearly formed by snow which fell at higher elevations, as proven by the notable O-18 depletion of these samples as compared to local snowfall. It is apparent that the origin of ice can be well identified by isotope measurements, irrespective of sample location and appearance. (Auth. mod.)

46-2663
Snow stratigraphy and accumulation at Browning Pass (Northern Victoria Land, Antarctica). Preliminary observations.
Meneghel, M., et al, *Società Geologica Italiana, Rome. Memorie*, 1991, Vol.46, Meeting on Earth Science Investigations in Antarctica, Siena, Oct. 4-6, 1989. Proceedings, p.49-58, With Italian summary. 15 refs.
Smiraglia, C.
Snow accumulation, Snow stratigraphy, Antarctica—Browning Pass.
Preliminary results on snow parameters recorded during 1988-89 summer at Browning Pass, an ice passage linking the Campbell Glacier with the Priestley Glacier, are presented. A topographic survey was made between the Pass and the confluence with Boomerang Glacier. Three lines of stakes were laid out to measure snow accumulation or ablation and surface velocities. Shallow pits were dug and observations were made on stratigraphy, temperature and density of the firn layers. (Auth.)

46-2664
Preliminary data on the mass balance of the Strandline Glacier (Terra Nova Bay, Antarctica).
Meneghel, M., et al, *Società Geologica Italiana, Rome. Memorie*, 1991, Vol.46, Meeting on Earth Science Investigations in Antarctica, Siena, Oct. 4-6, 1989. Proceedings, p.59-67, With Italian summary. 12 refs.
Smiraglia, C.
Glacier mass balance, Glacier ablation, Snow, Antarctica—Terra Nova Bay.
In 1988-89, investigations were carried out on the mass balance of the Strandline Glacier, a small alpine glacier on the coast of Gerlache Inlet, Terra Nova Bay. By using measurements along two stake alignments, from the end of summer 1988-89, the Strandline annual balance showed a slight deficit (average ice ablation of 353 mm of water equivalent along the cross profile in the lower sector of the glacier, and a mean accumulation of 97 mm of water equivalent at the highest measurement points). Over all the glacier a net specific mass balance of -20.4 mm was obtained. On the ice cliff margin during the summer of 1988-89 there was an ablation of 410 mm of water equivalent attributable to melting and calving. (Auth. mod.)

46-2665
Ice flow and surficial variation inferred from satellite image and aerial photograph analysis of Larsen Ice Tongue, Hells Gate and Nansen ice shelves (Victoria Land, Antarctica).
Baroni, C., et al, *Società Geologica Italiana, Rome. Memorie*, 1991, Vol.46, Meeting on Earth Science Investigations in Antarctica, Siena, Oct. 4-6, 1989. Proceedings, p.69-80, With Italian summary. 23 refs.
Frezzotti, M., Giraudi, C., Orombelli, G.
Glacier surfaces, Glacier flow, Ice sheets, Velocity measurement, Spaceborne photography, Topographic maps, Aerial surveys, Antarctica—Larsen Ice Shelf, Antarctica—Hells Gate, Antarctica—Nansen Ice Sheet.
The Nansen Ice Sheet covers an area of about 1,800 sq km. The mean ice surface velocity ranges from 120 to 360 m/yr. The highest velocities are found close to the ice barrier where the ice sheet spreads out. Between 1972 and 1988, the ice sheet increased by about 56 sq km at an average rate of 3.5 sq km/yr. The surface velocity of the Larsen Ice Shelf ranges from 115 to 170 m/yr. The ice tongue surface increased by about 19 sq km over the period 1957-1988. Hells Gate is a small ice shelf more than 70 sq km wide. A comparison of the aerial photographs taken in 1956-57 and 1985 shows that the mean ice surface velocity close to the calving margin varies from 3.3 m/yr in the eastern sector to 10.2 m/yr in the faster-moving western sector. The ice cliff retreated between 1956-57 and 1988 with an areal reduction of 1.15 sq km. In the same period, the ice lost to calving has been estimated between 2.5 and 3.5 million cu m/yr. A large amount of the ice broke away in winter 1987. (Auth. mod.)

46-2666
Radio-echo sounding of Enigma Lake (Northern Foothills, Victoria Land, Antarctica).
Lozej, A., et al, *Società Geologica Italiana, Rome. Memorie*, 1991, Vol.46, Meeting on Earth Science Investigations in Antarctica, Siena, Oct. 4-6, 1989. Proceedings, p.103-115, With Italian summary. 20 refs.
Radio echo soundings, Radar echoes, Glacial deposits, Ice composition, Ice dating, Lake ice, Limnology, Subglacial observations, Antarctica—Victoria Land.
Eight radar profiles were carried out on Enigma Lake, a small frozen lake located near the Terra Nova Bay Station. A G.S.S.I. radar with a 120 MHz antenna has been used and the exploration was carried out with a time range of 400 ns. The lake is entirely frozen to the bed and is up to 10 m thick. The lake's size and contour are determined by surrounding glaciers and snowdrifts. The buried bedrock topography is convex, similar to the contiguous glacially eroded hills. Shallow reflections near the central debris-covered area show that the lake is composed of two parts: an ice core covered by a thin and discontinuous veneer of debris, cropping out in the central area, and a superimposed layer of clean ice. Oxygen isotope analyses show that the inner core is Pleistocene fossil glacier ice, while the superimposed layer is Holocene lacustrine ice. (Auth. mod.)

46-2667
Granulite facies rocks of the Wilson Terrane (northern Victoria Land, Antarctica): Campbell Glacier.
Castelli, D., et al, *Società Geologica Italiana, Rome. Memorie*, 1991, Vol.46, Meeting on Earth Science Investigations in Antarctica, Siena, Oct. 4-6, 1989. Proceedings, p.197-203, 13 refs.
Glacial deposits, Glacial geology, Antarctica—Campbell Glacier.

46-2668
Preliminary survey of the underground thermal regime in the area around Terra Nova Bay, Victoria Land, Antarctica.
Rossi, A., *Società Geologica Italiana, Rome. Memorie*, 1991, Vol.46, Meeting on Earth Science Investigations in Antarctica, Siena, Oct. 4-6, 1989. Proceedings, p.457-461, With Italian summary. 8 refs.
Geothermometry, Permafrost thermal properties, Boreholes, Antarctica—Terra Nova Bay.
A survey of the geological and geothermal surface characteristics of the Mt. Melbourne volcanic area has led to a preliminary definition of the thermal regime in the area. With the exception of the top part of the Mt. Melbourne volcanic edifice, with fumaroles and exhalative manifestations, the surface thermal characteristics of the area are similar to those of other coastal regions of Antarctica unaffected by volcanic activity or other indicators of a geothermal anomaly. There is, however, probably a deep regional geothermal anomaly related to the recent tectonic evolution of the antarctic continental margin of the western coast of the Ross Sea, and to present-day volcanic activity in Victoria Land. (Auth.)

46-2669
Geochemistry and isotope chemistry of surface waters and geothermal manifestations at Terra Nova Bay (Victoria Land, Antarctica).
Cremisini, C., et al, *Società Geologica Italiana, Rome. Memorie*, 1991, Vol.46, Meeting on Earth Science Investigations in Antarctica, Siena, Oct. 4-6, 1989. Proceedings, p.463-475, With Italian summary. 22 refs.
Gianelli, G., Mussi, M., Torcini, S.
Isotopes, Limnology, Ice sublimation, Geothermometry, Water chemistry, Antarctica—Terra Nova Bay.
The small lakes in the part of northern Victoria Land explored by the Italian expedition show a wide range of total dissolved solids (0.02-27 g/l). The main water components are of marine origin derived from sea spray, as shown by the ratios between the major cations and anions. The salinity values point instead to a concentration in the dissolved solids due to evaporation and ice sublimation. Evaporation is also confirmed by the stable isotope data: the deltaO-18 and deltaD values spread along an evaporation line with slope of 6.15. The fumaroles at the summit area of Mt. Melbourne are the only geothermal manifestations in the area, and it is very unlikely that geothermal fluids contribute to the surface hydrology. (Auth.)

46-2670
Rock-enhanced thematic mapping of glaciated terranes from satellite imagery in Antarctica.
Salvini, F., et al, *Società Geologica Italiana, Rome. Memorie*, 1991, Vol.46, Meeting on Earth Science Investigations in Antarctica, Siena, Oct. 4-6, 1989. Proceedings, p.515-520, With Italian summary. 10 refs.
Image processing, Geological maps, Spaceborne photography, Mapping, Polar regions, Antarctica—Victoria Land.
This study is a first evaluation of satellite imagery of glaciated terranes, testing the geologic validity of satellite information and the feasibility of using such information to produce a thematic map for geological interpretation. The study area is the sector of northern Victoria Land bordered by the Reeves Glacier's southward and the Mountaineer Range northward. Approximately 90% of the surface is covered with ice, and it is assumed that the satellite imagery contains pixels representing pure ice (85%) or cropping out rock (5%), and pixels representing mixed ice and rock (10%). The purpose of the paper presented is to prepare a deicing algorithm to restore rock information in the pixels belonging to the last class (i.e. mixed ice and rock). (Auth. mod.)

46-2671
Satellite image mosaic of the Terra Nova Bay area (Victoria Land, Antarctica).
Borfecchia, F., et al, *Società Geologica Italiana, Rome. Memorie*, 1991, Vol.46, Meeting on Earth Science Investigations in Antarctica, Siena, Oct. 4-6, 1989. Proceedings, p.521-523, With Italian summary. 8 refs.
Frezzotti, M.
Spaceborne photography, Image processing, Mapping, Polar regions, Antarctica—Terra Nova Bay.
This note presents the mosaic of SPOT 1 Multispectral images made digitally from computer compatible tapes of 10 frames. The mosaic has been printed in false color (321 RGB) at a scale of 1:250,000 in a Lambert Conformal Conic projection. The image covers the Terra Nova Bay area of northern Victoria Land between the Drygalski and Parker ice tongues, and includes the Reeves and Priestley outlet glaciers and the basin of the Campbell Glacier. (Auth.)

46-2672
Under snow radar using microwave holography.
Sakamoto, Y., et al, International Symposium on Antennas and Propagation, Kyoto, Japan, Aug. 20-22, 1985. Proceedings, Vol.2. A step to new radio frontiers, Tokyo, Institute of Electronics and Communication Engineers of Japan, 1985, p.659-661.
Aoki, Y.
DLC TK 7871.6.I53 1985
Snow cover, Detection, Subsurface investigations, Radar echoes, Holography, Imaging, Microwaves, Snow depth.

46-2673
Scattering properties of snow in the 10- to 90-GHz range.
Hallikainen, M., International Symposium on Antennas and Propagation, Kyoto, Japan, Aug. 20-22, 1985. Proceedings, Vol.2. A step to new radio frontiers, Tokyo, Institute of Electronics and Communication Engineers of Japan, 1985, p.667-670, 9 refs.
DLC TK 7871.6.I53 1985
Snow surface, Surface roughness, Scattering, Radio waves, Attenuation, Grain size, Remote sensing.

46-2674
Snow stratigraphy measured with an active microwave sensor.
Fujino, K., et al, International Symposium on Antennas and Propagation, Kyoto, Japan, Aug. 20-22, 1985. Proceedings, Vol.2. A step to new radio frontiers, Tokyo, Institute of Electronics and Communication Engineers of Japan, 1985, p.671-674, 2 refs.
Wakahama, G., Suzuki, M., Matsumoto, T.
DLC TK 7871.6.I53 1985
Snow stratigraphy, Microwaves, Snow cover structure, Radar echoes, Reflectivity, Snow water equivalent, Sensors, Dielectric properties.

46-2675
Estimation of the water equivalent in dry snowpack using a FM-CW microwave sensor.
Suzuki, M., et al, International Symposium on Antennas and Propagation, Kyoto, Japan, Aug. 20-22, 1985. Proceedings, Vol.2. A step to new radio frontiers, Tokyo, Institute of Electronics and Communication Engineers of Japan, 1985, p.675-678, 8 refs.
Matsumoto, T., Fujino, K., Wakahama, G.
DLC TK 7871.6.I53 1985
Snow water equivalent, Remote sensing, Microwaves, Snow depth, Snow cover structure, Spectra, Reflectivity, Sensors, Dielectric properties.

46-2676
Microwave attenuation in sleet snowfall space.
Suzuki, M., et al, International Symposium on Antennas and Propagation, Kyoto, Japan, Aug. 20-22, 1985. Proceedings, Vol.3. A step to new radio frontiers, Tokyo, Institute of Electronics and Communication Engineers of Japan, 1985, p.1091-1094.
Sha, K., Nakagawa, E.
DLC TK 7871.6.I53 1985
Falling snow, Snow pellets, Velocity measurement, Scattering, Microwaves, Attenuation, Photographic techniques, Wave propagation.

46-2677
Incompatibility of ice-core CO2 data with reconstructions of biotic CO2 sources (2). The influence of CO2- fertilised growth.
Enting, I.G., *Tellus*, Feb. 1992, 44B(1), p.23-32, 22 refs.
Ice cores, Gases, Drill core analysis, Carbon dioxide, Atmospheric composition, Biomass, Accuracy, Periodic variations, Forecasting.

46-2678
Regular fluctuations of surface ozone at Georg-von-Neumayer Station, Antarctica.
Winkler, P., et al, *Tellus*, Feb. 1992, 44B(1), p.33-40, 22 refs.
Brylka, S., Wagenbach, D.
Polar atmospheres, Atmospheric composition, Ozone, Atmospheric circulation, Advection, Boundary layer, Periodic variations, Meteorological factors, Antarctica—Georg von Neumayer Station.
In this paper, it is shown that surface ozone at the Georg von Neumayer (GvN) Station in Antarctica exhibits long frequency fluctuations with periods of 30, 18, and 14 days. In some years, these periods are also visible in the temperature. Periods of 25-30 days have been established for antarctic radon- 222 in the literature in several investigations; however, radon- 222 measurements at GvN do not show the 30-day period which may be suppressed there by the meteorological situation. A hypothesis is proposed to explain how the periodic fluctuations of ozone and of radon-222 at GvN and other sites could be caused by long-range transport phenomena. The mechanism which induces the periodic fluctuations remains unknown. (Auth. mod.)

46-2679
Accumulation of Pb-210 at Summit, Greenland since 1855.
Dibb, J.E., *Tellus*, Feb. 1992, 44B(1), p.72-79, 14 refs.
Ice sheets, Snow stratigraphy, Age determination, Snow accumulation, Radioactive isotopes, Isotope analysis, Ice cores, Drill core analysis, Nuclear explosions, Snow air interface, Firn.

46-2680
Thermal performance of cool storage in packed capsules for air conditioning.
Chen, S.L., et al, *Heat recovery systems & CHP*, 1991, 11(6), p.551-561, 9 refs.
Yue, J.S.
Air conditioning, Coolants, Heat recovery, Porous materials, Phase transformations, Ice water interface, Solidification, Thermal analysis, Heat transfer, Temperature distribution.

46-2681
Seasonal development of ice algae near Chesterfield Inlet, N.W.T., Canada.
Welch, H.E., et al, *Canadian journal of fisheries and aquatic sciences*, Dec 1991, 48(12), p.2395-2402, With French summary. 25 refs.
Bergmann, M.A., Siferd, T.D., Amarualik, P.S.
Sea ice, Ice bottom surface, Algae, Growth, Biomass, Snow cover effect, Photosynthesis, Seasonal variations, Light effects.

46-2682
Sensitivity of the Southern Hemisphere circulation to leads in the antarctic pack ice.
Simmonds, I., et al, *Royal Meteorological Society. Quarterly journal*, July 1991, 117(501)Pt.B, p.1003-1024, 33 refs.
Budd, W.F.
Polar atmospheres, Atmospheric circulation, Air ice water interaction, Polynyas, Sea ice distribution, Surface temperature, Climatic factors, Heat flux, Global warming, Temperature variations, Antarctica—Weddell Sea.
Four experiments were conducted to assess the sensitivity of the Southern Hemisphere circulation to changes in the fraction of open water in the sea ice, using a July 21-wave General Circulation Model (GCM) with this fraction set to 5, 50, 80 and 100%. The mean surface temperatures and the surface atmospheric temperatures over the sea ice increased as the water fraction increased and the largest changes were simulated adjacent to the coast. Significant anomalies in the surface heat fluxes, particularly those of sensible heat, accompanied the decrease in the sea ice concentration. Substantial atmospheric warming was simulated over and in the vicinity of areas in which leads were considered. In all but one experiment there were anomalous easterlies between about 40 and 60S with westerly anomalies further to the south. The surface pressure at high latitudes appears to change in a consistent fashion with the fraction of open water, with the largest changes occurring in the Weddell and near the Ross Seas. Some of the feedbacks which may enhance the responses here, but which are not included in this model, are discussed. (Auth. mod.)

46-2683
Multi wavelength measurements of atmospheric turbidity and determination of the fluctuations in total ozone over Antarctica.
Singh, R., et al, *Atmospheric environment*, Mar. 1992, 26A(4), p.525-530, 7 refs.
Pasricha, P.K., Sharma, M.C., Srivastava, B.N.
Polar atmospheres, Ozone, Photometry, Aerosols, Atmospheric density, Solar radiation, Turbidity, Periodic variations.
Sun photometer measurements have been made at various wavelengths during a number of Indian expeditions to Antarctica. Measurements have also been made over the ocean on a cruise to one of the expeditions. Both the optical depth (a(H)) and the turbidity (T) due to atmospheric haze aerosols have been computed over the ocean and over Antarctica. In general, the values of the optical depth are higher at lambda = 368 nm than at lambda = 500 nm. The values of the optical depth (and turbidity) are also higher over the ocean than over Antarctica. Based on the measurements made at lambda = 368 and 500 nm, the exponent alpha = 2 describes the wavelength dependence of the optical depth. This wavelength dependence of the optical depth has been used to obtain the optical depth at lambda = 310 nm. The corresponding value of the selective absorption due to ozone is much greater than the aerosol optical depth a(H). The relative variability in the measured intensity at lambda = 310 nm, at a zenith angle of 60 deg, during this period is observed to be about 14%. The relative variability in the total ozone obtained from *in situ* measurements with the Total Ozone Mapping Spectrometer (TOMS) for the same period is about 3%. It is shown that the wavelength lambda = 310 nm, which is towards the upper limits of the UV-B band that is highly absorbed, is perhaps best suited to monitor fluctuations in the total ozone. This technique is likely to be more effective during the local spring period of Sep.-Nov. over Antarctica, where the phenomenon of the ozone hole occurs. (Auth. mod.)

46-2684
Rotational spectrum of H2 in water ice.
Taylor, D.G., III, et al, *Journal of chemical physics*, Mar. 1, 1992, 96(5), p.3367-3369, 9 refs.
Strauss, H.L.
Ice physics, Ice spectroscopy, Hydrogen, Molecular energy levels, Spectra, Molecular structure, Clathrates, Low temperature research.

46-2685
Growth and structure of amorphous ice condensates: a computational study—2.
Buch, V., *Journal of chemical physics*, Mar. 1, 1992, 96(5), p.3814-3823, 11 refs.
Ice physics, Amorphous ice, Ice models, Ice formation, Hydrogen bonds, Condensation, Molecular energy levels, Molecular structure, Surface structure.

46-2686
Polar stratospheric clouds and the ozone hole.
Hamill, P., et al, *Physics today*, Dec. 1991, 49(12), p.34-42, 22 refs.
Toon, O.B.
Polar atmospheres, Atmospheric composition, Ozone, Cloud physics, Chemical properties, Atmospheric density, Aerosols, Photochemical reactions, Air pollution.
Clouds of frozen nitric acid particles that form in the polar winter stratosphere are a crucial element in the massive springtime ozone depletion over Antarctica. This paper describes the mechanisms which govern the formation of such clouds, analyzes the chemical processes which appear to account for ozone depletion, and details meteorological variables which are implicated in the attenuation of atmospheric gases. (Auth. mod.)

46-2687
Program to correct anomalous subsurface temperature gradients resulting from surface temperature variations.
Mickus, K.L., et al, *Computers & geosciences*, 1991, 17(7), p.995-1008, 20 refs.
Baker, M.R.
Computer programs, Geophysical surveys, Temperature gradients, Temperature measurement, Accuracy, Surface temperature, Subsurface investigations, Heat flux, Boreholes.

46-2688
Mixed-phase microphysics and cloud electrification.
Williams, E.R., et al, *Journal of the atmospheric sciences*, Oct. 1, 1991, 48(19), p.2195-2203, 45 refs.
Zhang, R., Rydock, J.P.
Cloud physics, Cloud electrification, Snow pellets, Charge transfer, Thunderstorms, Vapor pressure, Ice sublimation, Precipitation (meteorology), Water content.

46-2689
Numerical-experimental study of the interaction of flat ice fields with a cylindrical support.
Danilenko, V.I., et al, *Mechanics of solids*, 1990, 25(6), p.185-189, Translated from Mekhanika tverdogo tela. 5 refs.
Rogachko, S.I.
Sea ice, Ice cover strength, Ice solid interface, Ice breaking, Ice loads, Ice mechanics, Cracking (fracturing), Mechanical tests, Offshore structures.

46-2690
Ion elution and release sequence from deep snowpacks in the central Sierra Nevada, California.
Berg, N.H., *Water, air, and soil pollution*, Jan. 1992, 61(1-2), p.139-168, 22 refs.
Snow cover, Snow composition, Impurities, Precipitation (meteorology), Runoff, Ion diffusion, Chemical properties, Snow hydrology, Air pollution, Ion density (concentration).

46-2691
Polarization lidar technique for cloud research: a review and current assessment.
Sassen, K., *American Meteorological Society. Bulletin*, Dec. 1991, 72(12), p.1848-1866, 62 refs.
Clouds (meteorology), Cloud physics, Lidar, Remote sensing, Ice crystal optics, Polarization (waves), Scattering, Precipitation (meteorology).

46-2692
Trace elements in snow samples from the Scottish Highlands: sources and dissolved/particulate distributions.
Jickells, T.D., et al, *Atmospheric environment*, Feb. 1992, 26A(3), p.393-401, 42 refs.
Snow cover, Snow composition, Impurities, Aerosols, Sampling, Chemical properties, Air pollution, Atmospheric circulation, Solubility.

46-2693
Geostrophic drag coefficients over sea ice.
Overland, J.E., et al, *Tellus*, Jan. 1992, 44A(1), p.54-66, 26 refs.
Davidson, K.L.
Sea ice, Drift, Atmospheric pressure, Boundary layer, Wind factors, Ice air interface, Analysis (mathematics), Drift stations, Wind direction.

46-2694
Relative dating of Quaternary moraines, Rongbuk Valley, Mt. Everest, Tibet: implications for an ice sheet on the Tibetan Plateau.
Burbank, D.W., et al, *Quaternary research*, July 1991, 36(1), p.1-18, 37 refs.
Cheng, K.J.
Pleistocene, Periglacial processes, Quaternary deposits, Moraines, Age determination, Glaciation, Weathering, Glacier oscillation, Glacial geology.

46-2695
Are lakes in the Cascade Mountains receiving high ammonium deposition.
Eilers, J.M., *Northwest science*, Nov. 1991, 65(5), p.238-247, 35 refs.
Snow cover, Ion density (concentration), Snow composition, Impurities, Chemical properties, Sampling, Air pollution, Limnology, Water pollution, Snow surveys.

46-2696
Ice technology for hazardous waste management.
Dash, J.G., *Waste management*, 1991, 11(4), p.183-189, 30 refs.
Waste treatment, Environmental protection, Safety, Artificial freezing, Soil freezing, Cryogenics, Linings, Subsurface structures, Leaching, Design.

46-2697
French Polar Expeditions. [Expéditions Polaires Françaises], Paris, 1987, n.p., In French.
Expeditions, Stations, Research projects, Antarctica—Dumont d'Urville Station.
The French Dumont d'Urville Station, established in 1956, is described. Research at the station has included studies on atmospheric physics, geomagnetism, seismology, human and animal biology, population dynamics, physiology, meteorology, and polar engineering. Temperatures rarely rise above 0 C, may drop to -35 C, and usually range between -10 and -20 C. Winds are usually 50 to 80 km/h with gusts up to 200 km/h. The highest recorded wind was 320 km/h in Jan. 1972. Two site plans of the station in 1962 and 1985, and a brief chronology of the French Polar Expeditions in Antarctica from 1950 to 1983 are included.

46-2698
IAHR—recommendations on testing methods in ice; 6th report of the Working Group on Testing Methods in Ice.
Häusler, F.U., ed, Sapporo, Japan, [1988], 24p., 12 refs. Presented at the IAHR Ice Symposium, Sapporo, 1988.
Ice sampling, Ice coring drills, Ice cutting, Augers, Ice refrigeration, Ice strength.

46-2699
Measurement of icing-related parameters on an American ship.
Lozowski, E.P., et al, Edmonton, University of Alberta, Nov. 25, 1988, 83p., 1 ref. Final report to the U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, NH.
Zakrzewski, W.P.
Ship icing, Sea spray, Ice detection, Ice accretion, Drops (liquids).

46-2700
CTD data—Kongsfjorden. Spitsbergen. August 1991.
Gilmour, P., *Scott Polar Research Institute. Sea Ice Group. Technical report*, Jan. 1992, No.92-1, 28p., 1 ref.
Oceanographic surveys, Sounding, Water temperature, Salinity, Meltwater, Ice water interface, Glacier tongues, Norway—Spitsbergen.

46-2701
Directory of expertise in Australia. Antarctica and the southern ocean. First edition—Tasmania.
Lyons, D.J., ed, Hobart, University of Tasmania, Institute of Antarctic and Southern Ocean Studies (IASOS), 1991, 52p.
Organizations, Research projects.
This is a directory of organizations and individuals based in Tasmania and interested in Antarctica. Included are indexes of 127 individuals, their organizations, and their fields of work.

46-2702
Acoustic scattering from elastic ice: a finite difference solution.
Fricke, J.R., Cambridge, Massachusetts Institute of Technology, 1991, 273p., Ph.D. thesis. 74 refs.
Ice acoustics, Underwater acoustics, Pressure ridges, Air ice water interaction, Ice edge, Sound transmission, Scattering, Mathematical models.

46-2703
Antarctic automatic weather station data for the calendar year 1990.
Keller, L.M., et al, Madison, University of Wisconsin, Dec. 1991, 383p.
Weidner, G.A., Stearns, C.R.
Weather stations, Meteorological data, Air temperature, Atmospheric pressure, Wind direction, Wind velocity.
A network of automatic weather station (AWS) units is deployed to collect antarctic surface weather observations in support of meteorological research projects and operational activities. The 1990 network consisted of 31 AWS units from the Antarctic Peninsula to the Adélie Coast. The site name, coordinates, and elevation are included for each unit. Each unit measures the air temperature, wind speed, and wind direction at a height of 3 m and air pressure at a height of 1.5 m. Some of the units also measure the relative humidity at 3 m and the vertical air temperature difference between 0.5 and 3 m. Monthly and three-hourly data summaries are provided for each AWS unit.

46-2704
Physical, mechanical and rheological characteristics of a clay soil during freezing. Application to Boom clay. [Caractéristiques physiques, mécaniques et rhéologiques d'un sol argileux lors de sa congélation. Application à l'argile de Boom],
Thimus, J.F., Louvain, Belgium, Université Catholique de Louvain, 1989, Var. p. (2 vols.), Ph.D. thesis. In French. Refs. p.7/1-7/15.
Soil freezing, Frozen ground strength, Artificial freezing, Frozen ground compression, Soil stabilization, Clay soils, Soil creep, Unfrozen water content, Analysis (mathematics).

46-2705
Physical mechanisms controlling the strength and deformation behavior of frozen sand.
Andersen, G.R., Cambridge, Massachusetts Institute of Technology, 1991, 560p. (2 vols.), Ph.D. thesis. Refs. p.548-560.
Soil freezing, Frozen ground strength, Frozen ground mechanics, Sands, Soil stabilization, Strain tests, Soil creep, Mathematical models.

46-2706
Acoustic monopole in a floating ice plate.
Stein, P.J., Cambridge, Massachusetts Institute of Technology, 1986, 315p., Ph.D. thesis. Refs. passim.
Ice acoustics, Underwater acoustics, Ice cracks, Ice water interface, Ice cover effect, Ice cover strength, Ice deformation, Elastic waves, Mathematical models.

46-2707
Paleoseismicity of the Cook Inlet region, Alaska: evidence from peat stratigraphy in Turnagain and Knik Arms.
Combellick, R.A., *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Professional report*, 1991, No.112, 52p., 37 refs.
Earthquakes, Geochronology, Peat, Stratigraphy, Drill core analysis, Radioactive age determination, Drilling, Subsidence, United States—Alaska—Cook Inlet.

46-2708
Ice thickness data, winter 1989-1990. Ottawa, Environment Canada, Atmospheric Environment Service, Ice Climatology and Applications Division, Ice Centre, 1991, 75p., In English and French.
Ice cover thickness, Ice surveys, Snow depth, Ice breakup, Freezeup, Canada.

46-2709
Review of possible technologies for the detection and tracking of submerged oil.
Smedley, J.B., et al, *Transport Canada. Publications*, June 1991, TP 1078E, 44p. + appends., With French summary. 36 refs.
Belore, R.C.
Oil spills, Oil recovery, Ocean environments, Weathering, Chemical properties, Water pollution, Detection, Sea water.

46-2710
Federal Arctic Research Information Workshop. Workshop proceedings.
Geiselman, J., ed, *U.S. Minerals Management Service. Alaska Outer Continental Shelf Region. OCS study*, July 1991, MMS 91-0053, 117p. + appends., Refs. passim. Extended abstracts of a workshop held in Anchorage, AK, Mar. 19-21, 1991.
Mitchell, K.L., ed.
Organizations, Research projects, Meetings.

46-2711
Snow and avalanches in the Swiss Alps, winter 1989/90. [Schnee und Lawinen in den Schweizer Alpen, Winter 1989/90], *Davos, Switzerland. Eidgenössisches Institut für Schnee- und Lawinenforschung. Winterbericht*, 1991, No.54, 165p., In German.
Avalanches, Snow accumulation, Snow surveys, Snowfall, Snow depth, Snow cover stability, Accidents, Switzerland—Alps.

46-2712
International Arctic Ocean Expedition 1991 USCGC *Polar Star* (WAGB 10).
U.S. Coast Guard, 1991, Var. p.
Icebreakers, Oceanographic surveys, Ice breaking, Ice navigation, Expeditions, Ice conditions.

46-2713
Dinoflagellate cyst from antarctic sea ice.
Buck, K.R., et al, *Journal of phycology*, Feb. 1992, 28(1), p.15-18, 17 refs.
Bolt, P.A., Betham, W.N., Garrison, D.L.
Sea ice, Microbiology, Plankton.
The small (<15 microns) hypnozygote of an autotrophic athecate dinoflagellate found in association with antarctic sea ice had an external covering composed of approximately 60 plates, each of which was bounded by sutural ridging and possessed an intratabular process. A cingulum and sulcus were also evident. The ultrastructure of the cyst was increasingly dominated by storage bodies as the cyst matured, and the cell wall thickened from 0.2 to 0.8 micron over 2 months. This cyst has been encountered often but usually at low abundances (1000-10,000 cells/L); however, the maximum abundances observed (1 million cells/L) indicate that the formation of this cyst may play an important part in the ecology of sea ice communities. (Auth. mod.)

46-2714
Spring polar ozone behavior.
Aikin, A.C., *Planetary and space science*, Jan. 1992, 40(1), p.7-26, Refs. p.24-26.
Ozone, Stratosphere, Clouds (meteorology), Atmospheric circulation, Atmospheric composition.
It has been recognized since the commencement of antarctic ozone measurements during the IGY that spring southern polar total ozone amount is less than spring northern polar total ozone amount. More importantly, since 1980 there has been a decline in the minimum spring total ozone value, from 250 DU in 1980 to 125 DU in 1987 and below 120 in 1991. This decline occurs within the winter polar vortex, which acts as a containment vessel preventing polar ozone from escaping to lower latitudes and excluding ozone-rich air from the polar region. Ozone decrease can be explained in terms of heterogeneous reactions of chlorine and nitrogen reservoir molecules on polar stratospheric clouds. These clouds form in the lower polar stratosphere during winter when temperatures in the Antarctic are sufficiently low to create water ice clouds. Clouds involving nitric acid form at higher temperatures. Chlorine reservoirs such as HCl are converted to Cl2, which is photodissociated in the presence of sunlight. The resulting Cl reacts with O3 to form ClO. Measurements of ClO and other species give agreement of theory and experiment within the uncertainties of the measurement. Heterogeneous chemistry accounts for most of the ozone hole. There is much less ozone depletion in the Arctic. This is the result of a less stable polar vortex and warmer temperatures, which reduce polar stratospheric cloud formation. (Auth. mod.)

46-2715
Polar oceans program of the Alaska SAR Facility.
Weeks, W.F., et al, *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.1-10, With French summary. 35 refs.
Weller, G., Carsey, F.D.
Geophysical surveys, Remote sensing, Sea ice distribution, Synthetic aperture radar, Ice conditions, Classifications, Spaceborne photography, Research projects, Image processing, Drift.

46-2716
Remote sensing and geographic information system training requirements in Arctic Canada.
Epp, H., et al, *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.11-14, With French summary. 12 refs.
Rigby, B., Bruce, B.
Remote sensing, Geophysical surveys, Natural resources, Education.

46-2717
Topographic data and satellite spectral response in subarctic high-relief terrain analysis.
Franklin, S.E., *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.15-20, With French summary. 34 refs.
Subarctic landscapes, Spaceborne photography, Remote sensing, Terrain identification, Image processing, Vegetation patterns, Classifications, Geomorphology, Periodic variations, Topographic features.

46-2718
Monitoring the water bodies of the Mackenzie Delta by remote sensing methods.
Mouchot, M.C., et al, *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.21-28, With French summary. 10 refs.
Alföldi, T., De Lisle, D., McCullough, G.
Deltas, Limnology, Remote sensing, Surface waters, Spaceborne photography, Sediment transport, Image processing, Geophysical surveys, Hydrology, LANDSAT, Canada—Northwest Territories—Mackenzie River Delta.

46-2719
Operational remote sensing of sea ice.
Falkingham, J.C., *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.29-33, With French summary. 12 refs.
Sea ice, Ice surveys, Remote sensing, Airborne radar, Ice conditions, Radar photography, Synthetic aperture radar, Data processing.

46-2720
Remote sensing of sea surface temperatures for aquaculture planning in northern Norway.
Kögeler, J., et al, *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.34-39, With French summary. 19 refs.
Dahle, S.
Oceans, Surface temperature, Remote sensing, Spaceborne photography, Image processing, Radiometry, Temperature distribution, Temperature variations, Shores.

46-2721
Remote sensing of permafrost by ground-penetrating radar at two airports in arctic Canada.
Judge, A.S., et al, *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.40-48, With French summary. 24 refs.
Tucker, C.M., Pilon, J.A., Moorman, B.J.
Remote sensing, Site surveys, Airports, Radar echoes, Permafrost thickness, Subsurface investigations, Snow cover effect, Ground ice.

46-2722
Mapping muskox habitat in the Canadian High Arctic with SPOT satellite data.
Pearce, C.M., *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.49-57, With French summary. 30 refs.
Arctic landscapes, Remote sensing, Spaceborne photography, Radiometry, Classifications, Terrain identification, Vegetation patterns, Animals, Sensor mapping.

46-2723
Calibration of aerial thermal infrared imagery for walrus population assessment.
Barber, D.G., et al, *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.58-65, With French summary. 14 refs.
Richard, P.R., Hochheim, K.P., Orr, J.
Remote sensing, Sea ice, Animals, Detection, Ice cover effect, Aerial surveys, Infrared photography, Thermal radiation, Image processing, Distribution.

46-2724
Detection and classification of muskox habitat on Banks Island, Northwest Territories, Canada, using Landsat Thematic Mapper data.
Ferguson, R.S., *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.66-74, With French summary. 47 refs.
Arctic landscapes, LANDSAT, Terrain identification, Vegetation patterns, Radiometry, Animals, Sensory mapping, Classifications.

46-2725
Measuring climatic state variables from SAR images of sea ice: the SIMS SAR validation site in Lancaster Sound.
Barber, D.G., et al, *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.108-121, With French summary. 77 refs.
Johnson, D.D., LeDrew, E.F.
Sea ice distribution, Image processing, Synthetic aperture radar, Spaceborne photography, Ice surveys, Climatic factors, Ice conditions, Ice surface, Remote sensing.

46-2726
Role of imaging radar in the development of the Canadian Arctic: background and applications.
Sutton, J., *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.122-129, With French summary. 19 refs.
Imaging, Radar photography, Ice conditions, Synthetic aperture radar, Side looking radar, Ice surveys, Sea ice, Aerial surveys, Performance, Ice navigation.

46-2727
Use of AVHRR thermal infrared imagery to determine sea ice thickness within the Chukchi polynya.
Groves, J.E., et al, *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.130-139, With French summary. 22 refs.
Stringer, W.J.
Sea ice, Ice cover thickness, Spaceborne photography, Radiometry, Polynyas, Surface temperature, Ice growth, Infrared photography, Heat transfer, Temperature variations.

46-2728
***In situ* measurements of micro-scale surface roughness of sea ice.**
Paterson, J.S., et al, *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.140-146, With French summary. 19 refs.
Brisco, B., Argus, S., Jones, G.
Sea ice, Microstructure, Surface roughness, Ice surface, Photographic techniques, Measuring instruments, Synthetic aperture radar, Backscattering.

46-2729
Derivation of snow water equivalent in boreal forests using microwave radiometry.
Foster, J.L., et al, *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.147-152, With French summary. 27 refs.
Chang, A.T.C., Hall, D.K., Rango, A.
Forest land, Remote sensing, Radiometry, Snow cover effect, Snow depth, Snow water equivalent, Brightness, Vegetation factors, Climatic factors.

46-2730
Lake and river ice investigations in northern Manitoba using airborne SAR imagery.
Leconte, R., et al, *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.153-163, With French summary. 25 refs.
Klassen, P.D.
Lake ice, Radar photography, River ice, Synthetic aperture radar, Ice surveys, Ice conditions, Classifications, Airborne radar, Brightness, Image processing.

46-2731
Location and areal extent of polynyas in the Bering and Chukchi Seas.
Stringer, W.J., et al, *Arctic*, 1991, 44(Supp.1), International Circumpolar Symposium on Remote Sensing of Arctic Environments, 1st, Yellowknife, Northwest Territories, Canada, May 1-3, 1990, p.164-171, With French summary. 26 refs.
Groves, J.E.
Sea ice distribution, Polynyas, Ice edge, Radiometry, Classifications, Spaceborne photography, Periodic variations, Statistical analysis, Meteorological factors.

46-2732
Ground freezing 91, Vol.1.
International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991, Rotterdam, A.A. Balkema, 1991, 395p., Refs. passim. For individual papers see 46-2733 through 46-2788.
Yu, X., ed, Wang, C.S., ed.
Soil freezing, Frozen ground strength, Frozen ground thermodynamics, Artificial freezing, Ground thawing, Soil water migration, Unfrozen water content, Frost heave, Frozen ground compression, Soil stabilization, Soil creep, Shaft sinking.

46-2733
Interpreting unconfined unfrozen water content.
Black, P.B., MP 3026, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.3-6, 6 refs.
Soil freezing, Frozen ground thermodynamics, Unfrozen water content, Soil water migration, Soil pressure.
Unfrozen water content measurements are usually obtained from unconfined specimens exposed to the atmosphere. These data are usually presented as a simple function of temperature, which presents technical difficulties in interpreting the data. These problems are relaxed if the unfrozen water content is expressed as a function of the pressure difference between the water and ice phases as given by expressions for surface tension and phase equilibrium. This interpretation is analogous to that used to describe the characteristics of ice-free soil water, so that expressions commonly used for those systems are applicable in modeling unfrozen water content.

46-2734
Prediction and control of frost damage to engineering projects in seasonally frost regions.
Chen, X.B., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.7-10, 4 refs.
Wang, Y.Q.
Frost heave, Soil freezing, Frozen ground mechanics, Frozen ground expansion, Frost penetration, Seasonal freeze thaw, Statistical analysis.

46-2735
Water and ion migration of frozen soils in open system.
Ershov, E.D., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.11-15, 7 refs.
Soil freezing, Frozen ground thermodynamics, Soil water migration, Frozen ground chemistry, Ion diffusion, Saline soils.

46-2736
Thermomechanical modelling of freezing soil.
Frémond, M., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.17-24, 8 refs.
Mikkola, M.
Soil freezing, Frozen ground thermodynamics, Frost heave, Soil water migration, Unfrozen water content, Freezing front, Saturation, Mathematical models.

46-2737
Results of the heat transfer analysis compared to thermal measurements made in an arcuate heater-LNG inground storage system.
Goto, S., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.25-31, 4 refs.
Takagi, S., Komatsubara, T.
Soil stabilization, Frost protection, Underground storage, Soil freezing, Heating, Heat transfer, Liquefied gases, Natural gas, Storage tanks.

46-2738
Regulation of ice liner freezing of deep underground storages.
Gur'ianov, I.E., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.33-39, 6 refs.
Votiakova, N.I.
Artificial freezing, Underground storage, Ice (construction material), Linings, Thermal insulation, Frozen ground thermodynamics, Frozen ground strength, Permafrost preservation.

46-2739
Effects of temperature on swelling of coal shale.
Huang, S.L., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.41-47, 11 refs.
Speck, R.C., Wang, Z.W.
Soil air interface, Soil strength, Soil water, Soil pressure, Clay soils, Temperature effects, Humidity, Soil freezing.

46-2740
Assessment of frost susceptibility of soils.
Kujala, K., International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.49-54, 13 refs.
Soil freezing, Frost heave, Frost resistance, Frozen ground strength, Frost penetration, Soil texture.

46-2741
Factors governing a frost heave ratio.
Miyata, Y., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.55-63, 7 refs.
Akagawa, S.
Frost heave, Soil freezing, Frost penetration, Frozen ground thermodynamics, Frozen ground compression, Soil pressure, Mathematical models.

46-2742
Transport of water through frozen soils.
Nakano, Y., MP 3027, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.65-70, 31 refs.
Soil water migration, Soil freezing, Frozen ground thermodynamics, Unfrozen water content, Temperature gradients, Water transport, Water pressure, Mathematical models.
A popular hypothesis among researchers on the mechanism of water transport through frozen soils is that the flow of water under non-isothermal conditions is induced by a gradient of unfrozen water pressure that develops in response to a temperature gradient. Recent results of experimental and mathematical studies have revealed two major and independent driving forces of water: the gradients of temperature and water content in unsaturated frozen soils, and the gradients of temperature and unfrozen water pressure in saturated frozen soils. These recent results cast serious doubt upon the validity of the popular hypothesis.

46-2743
Influence of freezing and thawing on suction of unsaturated soils.
Ogawa, S., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.71-76, 8 refs.
Nishimura, T., Fukuda, M.
Seasonal freeze thaw, Soil water migration, Frozen ground strength, Soil pressure, Thaw weakening, Soil strength.

46-2744
Model coupled heat, moisture and stress field of saturated soil during freezing.
Peng, X.M., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.77-82, 9 refs.
Chen, X.B., Wang, Y.Q.
Soil freezing, Frost heave, Frozen ground compression, Soil water migration, Frozen ground strength, Frozen ground thermodynamics, Mathematical models.

46-2745
Determination of unfrozen water content of an overconsolidated clay down to -160 C by sonic approaches — comparison with classical methods.
Thimus, J.F., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.83-88, 12 refs.
Aguirre-Puente, J., Cohen-Tenoudji, F.
Unfrozen water content, Soil freezing, Sound transmission, Acoustic measurement, Frozen ground thermodynamics, Clay soils.

46-2746
Thaw-consolidation process and calculation of frozen clayey soil.
Wu, Q.B., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.89-92, 4 refs.
Tong, C.J.
Thaw consolidation, Frozen ground strength, Ground thawing, Clay soils, Frozen ground settling.

46-2747
Water and solute migration of freezing soils in closed system under temperature gradients.
Xu, X.Z., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.93-98, 4 refs.
Deng, Y.S., Gao, W.Y., Wang, F.G.
Soil freezing, Soil water migration, Frozen ground thermodynamics, Frozen ground chemistry, Temperature gradients.

46-2748
Heat conduction analysis around cooled underground opening using the finite divided element method.
Yao, Y.J., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.99-104, 6 refs.
Kadota, S., Koga, S., Kamata, M.
Frozen rock temperature, Frozen ground thermodynamics, Conduction, Thermal conductivity, Analysis (mathematics).

46-2749
Heat and moisture exchange for freezing and thawing grounds.
Danielian, IU.S., et al, International Symposium on Ground Freezing, 6th, Beijing, Sep. 10-12, 1991. Proceedings. Ground freezing 91. Vol.1. Edited by X. Yu and C.S. Wang, Rotterdam, A.A. Balkema, 1991, p.105-111, 8 refs.
IAnitskiĭ, P.A.
Soil freezing, Ground thawing, Frozen ground thermodynamics, Heat transfer, Moisture transfer, Mathematical models, Soil water migration.

46-2750
Law of unfrozen water content change in frozen saline (NaCl) soils.
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Ground thawing, Unfrozen water content, Frozen ground strength, Soil strength.

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Frozen ground strength, Temperature effects, Soil creep, Clay soils, Artificial freezing.

46-2753
Strength of frozen soil under a combined stress state.
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Frozen ground strength, Soil creep, Frozen ground compression, Shear stress, Strain tests, Analysis (mathematics), Frozen ground mechanics.
New parabolic yield and creep strength criteria have been developed for frozen soil (ice) under a combined stress state. The criteria take into account that the local melting of ice causes the shear strength of frozen soil to reach a maximum at a certain level of the mean normal stress, considered in the paper to be a frozen soil mechanical parameter. At low stress levels the criteria transform into the von Mises-Drucker-Prager or Mohr-Coulomb yield criteria and into the von Mises or Tresca criteria for frictionless materials. It is shown that the failure surface in the principal stress space forms a paraboloid, the shape of which depends upon the ratio of the cohesion and the friction angle on the octahedral plane and their change with time. The criteria have been verified using test data for long- term strength under six different loading regimes (uniaxial compression and tension, pure shear and triaxial compression at various mean stresses) of Kellovian silt at -10 C. It was found that the shape of the normalized curve of the long-term strength and its parameters can be considered to be independent of the loading regime, and thus all the above test data can be superimposed on this curve.

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Frozen ground strength, Pile load tests, Penetration tests, Penetrometers, Permafrost beneath structures.

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Frozen ground strength, Frozen ground compression, Stress strain diagrams, Analysis (mathematics).

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46-2765
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46-2768
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Shen, M.
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46-2770
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46-2773
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46-2774
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46-2776
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46-2777
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46-2778
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Soil freezing, Artificial freezing, Shaft sinking, Flooding, Accidents, Soil stabilization.

46-2779
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46-2781
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46-2782
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Soil freezing, Artificial freezing, Tunneling (excavation), Frozen ground strength, Soil stabilization, Mathematical models, Soil creep, Frozen ground compression.

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46-2784
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46-2785
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Soil freezing, Artificial freezing, Shaft sinking, Slope protection, Soil stabilization.

46-2788
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46-2789
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Sea ice, Ice acoustics, Scattering, Wave propagation, Ice bottom surface, Surface roughness, Slope orientation, Analysis (mathematics).

46-2790
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46-2791
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Podsol, Soil formation, Distribution, Climatic factors, Snowmelt, Snow cover effect, Soil analysis, Geography, Seepage.

46-2792
Effects of the arctic sea ice on the variations of atmospheric general circulation and climate.
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Atmospheric circulation, Sea ice distribution, Ice cover effect, Climatic factors, Surface temperature, Air ice water interaction, Weather forecasting, Climatic changes.

46-2793
***Numerical study for mechanism of the effect of northern* summer arctic ice cover on the global short-range climate change.**
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Climatic changes, Polar atmospheres, Sea ice distribution, Ice cover effect, Atmospheric circulation, Air ice water interaction, Periodic variations, Mathematical models, Air temperature.

46-2794
Winter atmospheric circulation in the Arctic Basin and possible relationships to the Great Salinity Anomaly in the northern North Atlantic.
Serreze, M.C., et al, *Geophysical research letters*, Feb. 7, 1992, 19(3), p.293-296, 17 refs.
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46-2795
Isotopes and climates.
Bowen, R., London, Elsevier Science Publishers Ltd., 1991, 483p., Refs. passim.
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Isotopes, Isotope analysis, Paleoclimatology, Climatic changes, Ice cores, Ice composition, Global warming, Pleistocene, Oxygen isotopes, Environmental factors.

46-2796
Abundance and distribution of *tintinnid ciliates* in an ice edge zone during the austral autumn.
Buck, K.R., et al, *Antarctic science*, Mar. 1992, 4(1), p.3-8, Refs. p.7-8.
Garrison, D.L., Hopkins, T.L.
Sea ice, Microbiology, Cryobiology, Antarctica—Weddell Sea.
Tintinnid ciliates were present throughout the upper (100 m) water column of the ice-edge zone when sampled in autumn 1986 in the Weddell Sea. Biomass ranged from 0.02 micrograms C/l under the sea-ice to 1.3 micrograms C/l in the ice-free water column. *Cymatocylis, Codonellopsis, Laackmanniella* and a small *Salpingella* were the most abundant and/or largest biomass contributors. The under ice assemblage was characterized by low biomass and dominated by small species *(Salpingella* and *Codonellopsis)*; the ice edge stations were dominated by these same taxa but in higher abundances, while the open water assemblage was characterized by high biomass and dominated by *Cymatocylis*, the largest taxon. All taxa exhibited maximum concentrations in the upper 50 m of the water column. Both krill and salps grazed upon the *Cymatocylis* and *Codonellopsis* without preference in both the ice covered and open water regimes. (Auth.)

46-2797
Biochemical composition and photosynthate distribution in sea ice microalgae of McMurdo Sound, Antarctica: evidence for nutrient stress during the spring bloom.
Lizotte, M.P., et al, *Antarctic science*, Mar. 1992, 4(1), p.23-30, Refs. p.29-30.
Sullivan, C.W.
Sea ice, Algae, Photosynthesis, Antarctica—McMurdo Sound.
The nutrient status of microalgae inhabiting sea ice in McMurdo Sound was evaluated during the peak and decline of the spring bloom in Nov. and Dec. Natural populations of microalgae were analyzed for C, N, chlorophyll *a*, protein, lipid, polysaccharide, and low-molecular-weight carbohydrate content, and for the distribution of C-14-labelled photosynthate into macromolecular fractions. Ratios of N:C and protein to carbohydrate (PR:CHO) were similar to values reported for nutrient-limited phytoplankton. Biochemical ratios and C-14-photosynthate allocation patterns suggest that microalgae from congelation ice habitats may be more nutrient-stressed than those from underlying platelet ice habitats. This evidence suggests that sea ice microalgae are nutrient-stressed during the peak and decline of the spring bloom in McMurdo Sound, *which presumably begins when microalgal* biomass concentrations and demands for growth reach or exceed the rate of nutrient supply from underlying seawater. (Auth. mod.)

46-2798
Development of phytoplankton during the late winter/*spring transition in the eastern* Weddell Sea (Antarctica). [Die Entwicklung des Phytoplanktons im Östlichen Weddellmeer (Antarktis) beim Übergang vom Spätwinter zum Frühjahr],
Scharek, R., *Berichte zur Polarforschung*, 1991, No.94, 195p., *In German with English summary*. Refs. p.181-191.
Plankton, Sea ice, Ice melting, Polynyas, Antarctica—Weddell Sea.
The distribution and species composition of phyto- and protozooplankton were investigated in relation to the hydrographic and sea ice regimes in the Weddell Sea in late winter. Their growth and development during the winter-spring transition were also studied. Furthermore, the condition of the winter phytoplankton and the role of enhanced light levels in coastal polynyas, intrusion of meltwater and of "seeding" cells into the upper water layers during the transition to the spring situation were evaluated. Investigations were carried out between the beginning of Oct. and mid-Dec., before and during the course of sea ice melting, during the second leg of the Winter Weddell Sea Project (WWSP, 1986) on R.V. *Polarstern*. Two long sections through the pack ice of the eastern Weddell Gyre were conducted during Oct. and Dec. on the way to and from the polynyas along the southeastern coast. Transects perpendicular to the coast were carried out off Drescher Inlet in the coastal current (three before and three during sea ice melting). Before the onset of melting, several stations were also carried out in the very southern coastal polynya regions. The area of investigation can be separated into three zones: the northern sea ice edge zone, (54.5S-60S), the pack ice girdle of the eastern Weddell Gyre (60-70S), and the polynyas over the coastal current in the southeastern Weddell Sea (70-77S).

46-2799
Antarctic ice sheet and environmental change: a three- dimensional modelling study.
Huybrechts, P., *Berichte zur Polarforschung*, 1992, No.99, 241p., *With German summary*. Refs. p.223-241.
Ice sheets, Paleoclimatology, Models, Environments.
A qualitative description is given of the role of the antarctic ice sheet in the global environment system, and the possible modes of interaction are discussed. It is investigated using a high-resolution 3-D flow model covering the entire ice domain. This model incorporates a coupled ice shelf, grounding- line dynamics, basal sliding and isostatic bed adjustment. It has a full coupling between thermal field and ice flow, and the ice sheet geometry is freely generated in response to specified environmental conditions. The model is driven by changes in sea level, surface temperature and mass balance. A series of climatic experiments is performed, in which the model is used to examine the ice sheet during the last glacial-interglacial cycle. This involves a sensitivity study with respect to changing environmental conditions and a time-dependent simulation of the last glacial cycle. Fluctuations are essentially controlled by variations in eustatic sea level, whereas typical glacial- interglacial changes in temperature and ice deposition rates tend to balance one another. On the shorter greenhouse warming time scale, the model response is determined by changes in the mass balance. As long as the temperature rise is below 5 C, the antarctic ice sheet will probably grow, because melting at the ice sheet edge can still be offset by higher deposition rates on the plateau. The hypothesis of a catastrophic collapse of the West Antarctic ice sheet is not supported by the model results presented in this study. (Auth. mod.)

46-2800
Sediment-laden sea ice in the East Greenland Current.
Fretzdorf, S., et al, *Berichte zur Polarforschung*, 1991, No.93, p.33-37.
Rumohr, S.
Sea ice, Ice cores, Sediments, Greenland Sea.

46-2801
Remote sensing of the sea *in solid and liquid* form.
Garrity, C., et al, *Berichte zur Polarforschung*, 1991, No.93, p.41-49.
Remote sensing, Sea water, Sea ice, Ice floes, Microwaves.

46-2802
Limit equilibrium of ice jams.
Michel, B., *Cold regions science and technology*, Feb. 1992, 20(2), p.107-117, 27 refs.
River ice, Ice jams, Ice breakup, Ice pileup, Static stability, Ice cover strength, Hydraulics, Analysis (mathematics), Flood forecasting.

46-2803
Stress measurements in drifting pack ice.
Tucker, W.B., et al, *Cold regions science and technology*, Feb. 1992, 20(2), MP 3029, p.119-139, 28 refs.
Perovich, D.K.
Sea ice, Pack ice, Thermal stresses, Stress concentration, Ice pressure, Ice cover strength, Ice deformation, Measurement, Temperature effects.
Accurate measurements of *in-situ* pack ice forces are necessary to improve ice forecasting models and to estimate loads on offshore structures. Two months of *in-situ* ice stress measurements were obtained in the pack ice of the eastern Arctic during the fall of 1988. Sensors were placed to examine both the horizontal and vertical distributions of ice stresses in multiyear ice. Stresses in the multiyear ice 200 m from the edge of the floe reached 150 kPa during extreme deformation events. Within a few meters of the edge and in adjacent first-year ice, they exceeded 350 kPa on several occasions (400 kPa in one instance) during local ice failure events. Thermally induced stresses at shallow depths in the multiyear ice were caused by rapid temperature changes, and could be nearly as large as stresses observed during deformation. The vertical distribution of stresses varied with the type of deformation event, but the largest values were always observed in the upper half of the ice sheet. Stresses due to deformation were rapidly attenuated away from the edge of the floe. Near the edge, however, recorded stresses agreed well with those observed in the adjacent first- year ice. These two locations also experienced twice daily oscillations of about 50 kPa which are apparently tidal or inertially induced.

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Foundations, Soil mechanics, Frost heave, Soil tests, Classifications, Bridges, Water content, Analysis (mathematics).

46-2805
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[Akushev, V.S.
Frozen rocks, Low temperature tests, Hydrates, Gas inclusions, Decomposition, Frozen ground thermodynamics, Natural gas, Temperature effects, Sands

46-2806
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Weilenmann, P.
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46-2807
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Soil freezing, Frost heave, Soil water migration, Ice pressure, Interstitial ice, Heat transfer, Seepage, Mathematical models, Freezing front.

46-2808
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Aircraft icing, Antifreezes, Ice removal, Hoarfrost, Cold weather performance, Ice formation, Simulation, Specifications, Humidity.

46-2809
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Ice islands, Ice floes, Strain tests, Ice cores, Drill core analysis, Ice cover strength, Physical properties, Temperature effects, Ice forecasting.

46-2810
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Ice crystals, Ice creep, Ice models, Ice mechanics, Analysis (mathematics), Ice plasticity.

46-2811
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46-2812
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Meteorological data, Freezing indexes, Air temperature, Climatic changes, Periodic variations, Statistical analysis, Weather forecasting.

46-2813
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Cloud physics, Gamma irradiation, Ionization, Ice crystal growth, Atmospheric circulation, Heterogeneous nucleation, Meteorological factors, Solar activity, Periodic variations.

46-2814
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46-2815
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46-2816
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46-2817
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46-2818
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46-2821
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46-2822
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46-2823
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46-2824
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Atmospheric composition, Ice nuclei, Simulation, Ozone, Ice vapor interface, Cloud physics, Photochemical reactions, Aerosols, Chemical properties, Atmospheric density.

46-2825
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46-2826
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Ice sheets, LANDSAT, Synthetic aperture radar, Image processing, Resolution, Spaceborne photography, Ice surveys, Surface properties, Accuracy.

46-2827
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46-2828
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Ice sheets, LANDSAT, Spaceborne photography, Surface structure, Image processing, Ice surface, Albedo, Snow cover effect, Analysis (mathematics), Bedrock.

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Solutions, Salt water, Solidification, Freezing rate, Liquid solid interfaces, Thermal conductivity, Phase transformations, Mathematical models.

46-2830
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46-2831
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Meadow soils, Soil formation, Eolian soils, Snow cover effect, Soil analysis, Forest ecosystems, Soil mapping, Trees (plants), Vegetation factors.

46-2832
Dating with cushion plants: establishment of a *Silene acaulis* growth curve in the Canadian Rockies.
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Geobotanical interpretation, Glacial deposits, Mosses, Age determination, Alpine glaciation, Alpine landscapes, Growth, Periglacial processes, Vegetation patterns, Plant ecology.

46-2833
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46-2834
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Bacteria, Growth, Soil analysis, Alpine landscapes, Soil microbiology, Cold weather survival, Temperature effects, Soil formation.

46-2836
Mapping the depth of seasonal frost penetration of soils and ground in the northwest European part of the USSR. [Kartirovanie glubin sezonnogo promerzaniia pochv i gruntov na severo-zapade evropeĭskoĭ chasti SSSR].
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Frost penetration, Seasonal freeze thaw, Active layer, Clay soils, Mapping, Rheology, Cryogenic soils, Soil mechanics, Soil physics.

46-2837
Setting up engineering geological monitoring at gas transportation geotechnical systems in the Western Siberian gas- bearing province. [Organizatsiia inzhenerno-geologicheskogo monitoringa gazotransportnykh *geotekhnicheskikh sistem Zapadno-Sibirskoĭ* gazonosnoĭ provintsii],
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Engineering geology, Geocryology, Monitors, Anchors, Gas pipelines, Frozen ground temperature, Permafrost beneath structures, Frost heave, Freeze thaw cycles.

46-2838
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Geocryology, Engineering geology, Forecasting, Thaw depth, Soil temperature, Frozen ground temperature, Active layer, Analysis (mathematics).

46-2839
Characteristics of urban planning and construction in Western Siberian oil and gas complexes in latitudinal ranges. [Gradostroitel'nye osobennosti Zapadno-Sibirskogo neftegazovogo kompleksa v spetsifike shirotnykh zon].
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Urban planning, Cold weather construction, Environmental impact, Environmental protection, Taiga.

46-2840
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Cost analysis, Economic development, Gas production, Petroleum industry.

46-2841
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Poliankin, G.N., et al, *Transportnoe stroitel'stvo*, Sep. 1991, No.9, p.26-27, In Russian. 3 refs.
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Frost heave, Tunnels.

46-2842
Technology for making concrete with frost-resistant admixtures. [Osobennosti tekhnologii prigotovleniia betona s protivomoroznoi dobavkoi].
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Concrete admixtures, Countermeasures, Frost resistance, Concrete freezing.

46-2843
Evaluation of the effectiveness of percussion rippers designed for frozen ground. [Otsenka effektivnosti udarnykh rykhlitelei merzlogo grunta].
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46-2844
Bridges for Western Siberia. [Mosty dlia Zapadnoi Sibiri].
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Bridges, Cold weather construction, Permafrost beneath structures, Frost heave, Design.

46-2845
Best way to develop the North. [Kak luchshe osvaivat' Sever].
Kotliakov, V.M., et al, *Akademiia nauk SSSR. Vestnik*, Sep. 1991, No.9, p.57-64, In Russian.
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Economic development, Environmental impact, Environmental protection.

46-2846
From the Pamirs to the North Pole. [Ot Pamira do Severnogo poliusa].
Grigor'ev, A.A., *Akademiia nauk SSSR. Vestnik*, Sep. 1991, No.9, p.106-110, In Russian.
Expeditions, History.

46-2847
Lithogenic characteristics of deposits of the mountain glaciation subformation in Zailiysky Alatau. [Osobennosti litogeneza otlozhenii subformatsii gornogo oledeneniia Zailiiskogo Alatau].
Shipulina, V.G., et al, *Inzhenernaia geologiia*, Apr. 1991, No.4, p.25-37, In Russian. 19 refs.
Engel's, A.A.
Mountain glaciers, Moraines, Glacial deposits, Lithology, Lacustrine deposits, Glacial lakes.

46-2848
Complexes of cryogenic processes and formations on the Taz Peninsula and an estimate of their development. [Kompleksy kriogennykh protsessov i obrazovanii na Tazovskom poluostrove i prognoznaia otsenka ikh razvitiia].
Garagulia, L.S., et al, *Inzhenernaia geologiia*, Apr. 1991, No.4, p.51-63, In Russian. 10 refs.
Ruzhanskii, V.E.
Geocryology, Thaw depth, Frozen ground temperature, USSR--Taz Peninsula.

46-2849
Principles for setting up lithomonitoring of architectural monuments in the Russian North (in the example of Kirillov-Belozersky Monastery). [Printsipy organizatsii litomonitoringa ansamblei pamiatnikov arkhitektury Russkogo Severa (na primere Kirillo-Belozerskogo monastyria)].
Nevecheria, V.L., et al, *Inzhenernaia geologiia*, Apr. 1991, No.4, p.123-132, In Russian. 7 refs.
Podborskaia, V.O.
Engineering geology, Geocryology, Foundations, Frost heave, Seasonal freeze thaw.

46-2850
Atmospheric net transport of water vapor and latent heat across 70S.
Giovinetto, M.B., et al, *Journal of geophysical research*, Jan. 20, 1992, 97(D1), p.917-930, Refs. p.928-930.
Bromwich, D.H., Wendler, G.
Moisture transfer, Vapor transfer, Heat transfer, Ice air interface, Glacier mass balance.
The annual net atmospheric transports of water vapor and latent heat poleward across 70S are estimated using the latest compilation of surface mass balance for the antarctic ice sheet and new estimates of precipitation and evaporation in sectors of the southern oceans and of seaward drifting snow transport in particular sectors of the ice sheet. The mass and energy exchange rates at the ice sheet-atmosphere and ocean- atmosphere interfaces are integrated strictly for areas within that latitude. The estimates of net southward water vapor transport (6.6 kg/m/s) and latent transport (18.9 MJ/m/s) are larger than reported in all preceding studies, based on atmospheric advection and moisture data collected at stations located between 66S and 80S, and are generally in agreement with those based on surface mass balance data and seaward drifting snow transport across the ice terminus which extends between 65S and 79S. (Auth.)

46-2851
Longitudinal floating structures--new concepts in river ice control.
Calkins, D.J., *Canadian journal of civil engineering*, Dec. 1991, 18(6), MP 3030, p.933-939, With French summary. 14 refs.
River ice, Ice jams, Ice prevention, Ice control, Floating structures, Hydraulic structures, Ice cover thickness, Flood control, Design.
Ice control structures placed in the streamwise direction of a river were analyzed to determine the effectiveness in reducing ice jam thickness. The theory describing the thickness for "wide" river ice jams was modified to analyze these longitudinal types, providing the computational verification that ice jam thicknesses could be reduced where the mode of ice cover thickening is internal collapse. These longitudinal structures appear to provide a new tool for modifying the river ice regime at freeze-up and possibly at breakup. By decreasing the ice jam thickness, which leads to lower stages, the structures have the potential for decreasing ice jam flood levels. The structures' ability to function is independent of the flow velocity, and these structures should perform in rivers with velocities greater than the usual limitation of roughly 1 m/s associated with conventional cross-channel ice booms. Other possible applications include controlling ice movement at outlets from lakes, enhancing river ice cover progression, or even restraining the ice cover at breakup. A U.S. patent application has been filed jointly by the author and U.S. Army Corps of Engineers.

46-2852
Freeze-thaw sludge conditioning and double layer compression.
Vesilind, P.A., et al, *Canadian journal of civil engineering*, Dec. 1991, 18(6), MP 3031, p.1078-1083, With French summary. 11 refs.
Wallinmaa, S., Martel, C.J.
Sludges, Waste treatment, Freeze thaw cycles, Ion diffusion, Freezing points, Hygroscopic water, Salinity, Coalescence, Freeze drying.
Freeze-thaw conditioning of water and wastewater sludges is known to be an effective and economical means of promoting dewatering when natural freezing is employed. When sludge freezes, both the suspended and dissolved solids are rejected by the growing ice front. Particles trapped in ice have a very thin layer of surrounding water which does not freeze at normal temperatures. Dissolved solids are thought to accumulate in this layer, causing an increase in the ionic strength of the water. This may cause compression of the double layer, leading to neutralization of repulsive forces, thus promoting aggregation. In order to test this hypothesis, ionic strength was increased by adding sodium chloride (NaCl) to water and wastewater sludges and measuring dewaterability (filtration) with a capillary suction time (CST) apparatus. Four different kinds of sludge were used: alum sludge (water treatment), waste- activated sludge, simultaneous precipitation, and anaerobically digested mixed sludge. Salinities of 0-20,000 mg/L as NaCl were tested with every sludge. No enhancement in dewaterability with freeze-thawed sludges of raised ionic strength compared to zero salinity was recorded, therefore the hypothesis of double layer compression being a major factor in freeze-thaw conditioning is apparently invalid

46-2853
Potential response of an arctic watershed during a period of global warming.
Hinzman, L.D., et al, *Journal of geophysical research*, Feb. 29, 1992, 97(D3), p.2811-2820, 34 refs.
Kane, D.L.
Watersheds, Global warming, Climatic changes, Surface temperature, Active layer, Hydrologic cycle, Ground thawing, Thermal regime.

46-2854
Parameterization of ice cloud optical properties for climate models.
Ebert, E.E., et al, *Journal of geophysical research*, Mar. 20, 1992, 97(D4), p.3831-3836, 26 refs.
Curry, J.A.
Climatology, Cloud physics, Ice crystal optics, Solar radiation, Wave propagation, Particle size distribution, Water content, Transmissivity.

46-2855
Directional wave spectra estimation in a marginal ice zone using linear prediction.
Larouche, P., et al, *Journal of physical oceanography*, Feb. 1992, 22(2), p.196-206, 35 refs. For another version see 46-1467.
Cariou, C.
Pack ice, Oceanography, Ice edge, Water waves, Wave propagation, Radar photography, Image processing, Synthetic aperture radar, Spectra, Resolution.

46-2856
Environmental radiocesium in subarctic and arctic Alaska following Chernobyl.
Baskaran, M., et al, *Arctic*, Dec. 1991, 44(4), p.346-350, With French summary. 19 refs.
Kelley, J.J., Naidu, A.S., Holleman, D.F.
Fallout, Radioactivity, Ecosystems, Sampling, Environmental impact, Atmospheric circulation, Ecology.

46-2857
Cryostability of lattices in freeze-thaw processes, according to H-2 NMR data.
Grigor'ev, V.IU., et al, *Colloid journal of the USSR*, Nov. 1991, 53(3), p.391-394, Translated from Kolloidnii zhurnal. 12 refs.
Nikolaev, B.P., Shliakov, A.M.
Colloids, Heavy water, Cryogenics, Nuclear magnetic resonance, Stability, Freeze thaw tests, Hygroscopic water, Protective coatings, Adsorption, Chemical analysis.

46-2858
Heat transfer enhancement in the direct contact melting process.
Saito, A., et al, *International journal of heat and mass transfer*, Feb. 1992, 35(2), p.295-305, With French, German and Russian summaries. 11 refs.
Hong, H., Hirokane, O.
Ice melting, Topographic effects, Phase transformations, Ice solid interface, Heat transfer, Surface temperature, Surface structure, Ice heat flux, Analysis (mathematics).

46-2859
Freezing of a paraffin flow downstream of an abrupt expansion.
Myrum, T.A., et al, *International journal of heat and mass transfer*, Feb. 1992, 35(2), p.421-431, With French, German and Russian summaries. 26 refs.
Thumma, S.
Laminar flow, Freezing points, Hydrodynamics, Phase transformations, Fluid dynamics, Heat transfer, Liquid solid interfaces, Joints (junctions).

46-2860
Antarctic lessons on prefabrication.
Incoll, P.G., [Melbourne, Australian Construction Services, 1991], 10 leaves, 4 refs.
Cold weather construction, Construction materials, Prefabrication, Antarctica.
The architect author discusses some of the things learned from a number of years working on antarctic construction projects. Despite numerous disadvantages, the advantages inherent in prefabricated construction still make this the construction method of choice. Cited especially are the ease of replacement of building elements and better original quality of materials and work at factory sites, as opposed to the uncomfortable and even dangerous antarctic venues.

46-2861
Use of satellite based information in snowmelt run-off studies.
Upadhyay, D.S., et al, *Mausam*, Apr. 1991, 42(2), p.187-194, With Hindi summary. 6 refs.
Snow hydrology, Snowmelt, Runoff forecasting, Spaceborne photography, Radiometry, Snow cover distribution, Seasonal variations, Meteorological data.

46-2862
Organochlorine pesticides and polychlorinated biphenyls in the Arctic Ocean food web.
Hargrave, B.T., et al, *Archives of environmental contamination and toxicology*, Jan. 1992, 22(1), p.41-54, Refs. p.52-54.
Sea water, Water pollution, Biomass, Hydrocarbons, Ice sampling, Sea ice, Subglacial observations, Environmental impact, Ice bottom surface, Chemical composition.

46-2863
Strategies of survival in plants of the Fennoscandian tundra.
Sonesson, M., et al, *Arctic*, June 1991, 44(2), p.95-105, Refs. p.103-105.
Callaghan, T.V.
Tundra, Plant ecology, Ecosystems, Cold weather survival, Growth, Snow cover effect, Seasonal variations, Vegetation patterns.

46-2864
Copepods in ice-covered seas—distribution, adaptations to seasonally limited food, metabolism, growth patterns and life cycle strategies in polar seas.
Conover, R.J., et al, *Journal of marine systems*, July 1991, 2(1-2), p.1-41, Refs. p.35-41.
Huntley, M.
Marine biology, Plankton, Ecology, Sea ice, Ice cover effect, Biomass, Subglacial observations, Light effects, Oceanography.
In the polar seas, the combination of a shallow, generally stable mixed layer with a close proximity to abundant food make the under-ice zone a suitable nursery for both pelagic and benthic species, an upside-down benthos for opportunistic substrate browsers, and a rich feeding environment for species often considered to be neritic in temperate environments. Where the ice cover is not continuous there may be a retreating ice edge that facilitates the seasonal production of phytoplankton primarily through increased stability from the melt water. Ice edge blooms similarly encourage secondary production by pelagic animals. The rate of growth of arctic or antarctic zooplankton is not so important as assuring a high level of fecundity when maturity comes. Overwintering is probably not a great hardship and diapause may not be a useful strategy, because the environmental temperature is constantly near the freezing point of sea water, and basal metabolism accordingly low. Nonetheless, feeding behavior and metabolic rates have strong seasonal signals. In the absence of other stimuli, light must be involved in the transformation from winter to summer metabolism and vice versa, but the mechanisms still remain obscure. This paper describes the diverse growth and adaptation process of copepod species in polar oceans. (Auth. mod.)

46-2865
Ice algal photosynthesis at Resolute and Saqvaqjuac in the Canadian Arctic.
Bergmann, M.A., et al, *Journal of marine systems*, July 1991, 2(1-2), p.43-52, 15 refs.
Welch, H.E., Butler-Walker, J.E., Siferd, T.D.
Sea ice, Algae, Ice bottom surface, Photosynthesis, Biomass, Snow cover effect, Marine biology, Ecosystems, Seasonal variations.

46-2866
Sea ice macrofauna in the Antarctic and the Arctic.
Gulliksen, B., et al, *Journal of marine systems*, July 1991, 2(1-2), p.53-61, 48 refs.
Lönne, O.J.
Sea ice, Biomass, Marine biology, Ice cover effect, Classifications, Ecosystems.
In this paper, sea ice faunal assemblages with invertebrates and fish are recorded both in the Antarctic and the Arctic. Primary structuring factors of the assemblages are age and drift pattern of the ice, hydrography and water currents in the immediate vicinity of the ice, and distance to the benthic habitat. Allochthonous sympagic organisms (temporary occupants of the ice) are recorded both in the Antarctic and the Arctic. They may be pelago-sympagic or bentho-sympagic according to their habitat when not living in the ice. Examples of pelago-sympagic organisms from the Antarctic are the krill *(Euphausia superba)* and the notothenoid fish *Pagothenia borchgrevinki;* examples from the Arctic are the polar cod *(Boreogadus saida)* and copepods *(Calanus glacialis)*. (Auth. mod.)

46-2867
Atmospheric boundary layer measurements over sea ice in the Sea of Okhotsk.
Shirasawa, K., et al, *Journal of marine systems*, July 1991, 2(1-2), p.63-79, 60 refs.
Aota, M.
Sea ice distribution, Ice cover effect, Boundary layer, Ice air interface, Drift, Ice surveys, Radar echoes, Ice heat flux, Wind factors, Surface roughness.

46-2868
Transport of CO2 into arctic and antarctic seas: similarities and differences in the driving processes.
Anderson, L.G., et al, *Journal of marine systems*, July 1991, 2(1-2), p.81-95, 39 refs.
Jones, E.P.
Biomass, Carbon dioxide, Air ice water interaction, Atmospheric pressure, Vapor transfer, Surface waters, Sea water, Air pollution, Convection.
The transport of CO2 from the atmosphere to the surface water of the ocean is driven by the difference in partial pressure of CO2 at the air-sea interface. Since the atmospheric partial pressure of CO2 is nearly constant over periods of the order of exchange times, changing conditions of the surface of the ocean dominate the exchange process. In polar regions, the partial pressure of CO2 in the ocean is decreased mainly by two processes: a decrease in temperature and biological productivity. Both take place in the Arctic and Antarctic. In the Arctic, the vertical transport of cooled surface water by deep convection occurs mainly in the Greenland Sea and penetrates to a large depth, while in the Antarctic the deep convection does not primarily reach the same depths. Biological production is significant for the vertical transport of carbon in both the Arctic and Antarctic; however, in the Arctic the production is mainly over the large shelves, while in the Antarctic it takes place mostly over the deep ocean. In addition to cooling, surface water can also increase its density by salt addition from ice formation. When this happens over the shelves, high density shelf bottom waters are formed that might be enriched in total carbonate due to decay of organic matter at the sediment surface. These high density bottom waters flow towards the deep ocean, mixing with surrounding waters during transit and ending up at a matching density surface. This process seems to be quantitatively more important in the Arctic than in the Antarctic. Total alkalinity, total carbonate, calcium, oxygen, salinity and temperature data from several expeditions in the Arctic and the SWEDARP 88/89 expedition in the Antarctic are used in this discussion. (Auth. mod.)

46-2869
Productivity of sea ice algae: *in situ* vs. incubator methods.
Smith, R.E.H., et al, *Journal of marine systems*, July 1991, 2(1-2), p.97-110, 43 refs.
Herman, A.W.
Sea ice, Algae, Ice bottom surface, Photosynthesis, Biomass, Ice cover effect, Marine biology, Sampling, Ecosystems, Correlation.

46-2870
Under-ice physical oceanographic processes.
Prinsenberg, S.J., et al, *Journal of marine systems*, July 1991, 2(1-2), p.143-152, 8 refs.
Ingram, R.G.
Sea ice, Ice water interface, Ocean currents, Ice cover effect, Subglacial observations, Oceanography, Buoyancy, Seasonal variations, Friction.

46-2871
Characteristics of the turbulent oceanic boundary layer under sea ice. Part 1: a review of the ice-ocean boundary layer.
Shirasawa, K., et al, *Journal of marine systems*, July 1991, 2(1-2), p.153-160, 47 refs.
Ingram, R.G.
Sea ice, Ice water interface, Turbulent boundary layer, Hydrodynamics, Ocean currents, Ice cover effect, Ice bottom surface, Buoyancy, Surface roughness.

46-2872
Characteristics of the turbulent oceanic boundary layer under sea ice. Part 2: measurements in southeast Hudson Bay.
Shirasawa, K., et al, *Journal of marine systems*, July 1991, 2(1-2), p.161-169, 13 refs.
Ingram, R.G.
Sea ice, River flow, Turbulent boundary layer, Ocean currents, Ice water interface, Hydrodynamics, Flow rate, Subglacial observations, Buoyancy.

46-2873
Review of the surface climate of the Southern Hemisphere and some comparisons with the Northern Hemisphere.
Van Loon, H., *Journal of marine systems*, July 1991, 2(1-2), p.171-194, 14 refs.
Polar atmospheres, Climatology, Surface temperature, Ice cover effect, Correlation, Seasonal variations, Temperature variations.
This review points out features in the annual curves of some climate elements on the Southern Hemisphere which differ from their counterpart on the Northern Hemisphere. Among the topics are the effect on the surface air temperature of the different proportions of land and water at corresponding latitudes, including the decreasing annual temperature range with increasing latitude in the temperate regions of the Southern Hemisphere which is found only in limited open-ocean areas on the Northern Hemisphere. The change of sea level mean pressure in middle and high south latitudes through the year is dominated by a semi-annual wave which changes phase near 60 S from equinoctial maxima in the north to solstitial maxima in the south. A dominant semi-annual wave in the wind and the Antarctic Circumpolar Current is associated with the pressure wave. In the Northern Hemisphere the large land masses in middle and high latitudes impose an overwhelming mean annual wave on the circulation, although locally there are appreciable semi-annual components. (Auth.)

46-2874
Mesoscale eddies and chimneys in the marginal ice zone.
Sandven, S., et al, *Journal of marine systems*, July 1991, 2(1-2), p.195-208, 51 refs.
Johannessen, O.M., Johannessen, J.A.
Sea ice, Ice edge, Ocean currents, Water temperature, Ice water interface, Stratification, Oceanography, Climatic factors, Models.

46-2875
Bio-physical oceanographic interactions at the edge of the arctic ice pack.
Niebauer, H.J., *Journal of marine systems*, July 1991, 2(1-2), p.209-232, 49 refs.
Oceanography, Sea ice distribution, Ice edge, Ocean currents, Ice water interface, Biomass, Seasonal variations.
About 7% of the world ocean is subject to the seasonal advance and retreat of sea ice. Physical processes at ice edges, interacting with biological phenomena, have been observed to promote phytoplankton blooms in both the Arctic (e.g., Bering and Greenland Seas) and the Antarctic. This interaction occurs primarily in spring with the retreating and melting sea ice laying down low-salinity derived stratification that reduces mixing in the photic zone, which encourages a phytoplankton bloom. However, other physical processes such as oceanic eddys and fronts also play a role in enhancing primary productivity at the ice edge. This paper reviews biophysical oceanographic and meteorological interactions observed in both the eastern (Greenland Sea) and western (Bering Sea) Arctic. Comparisons of the physical and biological characteristics for these areas, as well as additional comparisons with the Barents Sea and antarctic waters and other regions of the world ocean are presented. An estimate of some outstanding marginal ice edge research problems is also included. (Auth. mod.)

46-2876
Tracers of near-surface, halocline and deep waters in the Arctic Ocean: implications for circulation.
Jones, E.P., et al, *Journal of marine systems*, July 1991, 2(1-2), p.241-255, 34 refs.
Anderson, L.G., Wallace, D.W.R.
Ocean currents, Chemical analysis, Sea ice distribution, Ice cover effect, Hydrography, Meteorological factors, Geochemistry, Water temperature.

46-2877
Characteristiks of an ice-forming aerosol, created by airborne generators in high-speed air flow. [Kharakteristiki l'doobrazuiushchego aerozolia, sozdavaemogo samoletnym generatorom v skorostnom vozdushnom potoke],
Bakhanova, R.A., et al, *Ukrainskiĭ regional'nyĭ nauchno- issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1991, Vol.242, p.102-110, In Russian. 4 refs.
Aerosols, Ice formation, Ice nuclei, Airborne equipment.

46-2878
Frost resistance of concretes with low water-cement ratios. [Morozostoĭkost' betonov s nizkimi vodotsementnymi otnosheniiami],
Zinov, I.A., et al, *Izvestiia vysshikh uchebnykh zavedeniĭ. Stroitel'stvo*, Jan. 1992, No.1, p.53-57, In Russian. 3 refs.
Gorbunov, S.P., Trofimov, B.IA.
Frost resistance, Concretes, Concrete strength.

46-2879
Effect of the thermal regime in large diameter wells on drilling and the quality of sampling during the exploration of frozen placers. [Vliianie temperaturnogo rezhima v skvazhinakh bol'shogo diametra na burenie i kachestvo oprobovaniia pri razvedke merzlykh rossypeĭ],
Minakov, V.M., et al, *Izvestiia vysshikh uchebnykh zavedeniĭ. Geologiia i razvedka*, Mar. 1991, No.3, p.118-126, In Russian.
Morozov, I.V., Sirotkin, A.O., Maraev, A.I.
Thermal regime, Temperature effects, Drilling, Sampling, Placer mining, Heat transfer, Analysis (mathematics), Air temperature, Frozen rock temperature.

46-2880
1992 Subzero Engineering Conference Proceedings.
Subzero Engineering Conditions Conference Proceedings, Helsinki, Finland, Feb. 3-6, 1992, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, 329p., P-248. For individual papers see 46-2881 through 46-2914.
Cold weather operation, Cold weather performance, Motor vehicles, Engines, Diesel engines, Low temperature tests, Lubricants, Fuel additives, Coolants, Cooling systems, Heating.

46-2881
Single-cylinder engine facility to study cold starting —results with propane and gasoline.
Quader, A.A., Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.1-13, 6 refs.
Engines, Cold weather performance, Low temperature tests.

46-2882
Heating systems for cold starting of IC engines.
Stecki, J.S., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.15-23, 7 refs.
Cichocki, W., Garbacik, A., Szewczyk, K.
Diesel engines, Cold weather performance, Low temperature tests, Electric heating.

46-2883
Measurement of regulated and unregulated emissions at low ambient temperature.
Nylund, N.-O., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.25-31, 16 refs.
Low temperature research, Low temperature tests, Engines, Cold weather operation, Air pollution.

46-2884
Diesel engine cold starting: combustion instability.
Henein, N.A., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.33-48, 11 refs.
Zahdeh, A.R., Yassine, M.K., Bryzik, W.
Diesel engines, Cold weather performance, Cold weather operation.

46-2885
Spark plug fouling: a quick engine test.
Quader, A.A., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.49-59, 10 refs.
Dasch, C.J.
Low temperature tests, Engines, Cold weather performance.

46-2886
Neste's solution to computerize CEC cold driveability and CEC cold operability tests performed in chassis dynamometer.
Kolhanen, A., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.61-73.
Kokko, J., Rautiola, A.
Low temperature tests, Cold weather operation, Computer programs, Computer applications, Data processing.

46-2887
Behaviour of hydraulic systems in low operating temperatures.
Stecki, J.S., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.75-81, 7 refs.
Szewczyk, K., Lisowski, E.
Cold weather operation, Low temperature tests, Hydraulics, Machinery, Rheology.

46-2888
Research on the behaviour of heavy mobile machinery in simulated subzero conditions.
Stecki, J.S., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.83-89, 7 refs.
Szewczyk, K., Lisowski, E.
Cold weather performance, Cold weather operation, Machinery, Low temperature tests, Hydraulics.

46-2889
Computer aided analysis of heat flows in vehicle cooling system.
Veshagh, A., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.91-103, 12 refs.
Moffatt, R.
Computerized simulation, Cooling systems, Motor vehicles, Cold weather operation, Coolants.

46-2890
Improving the operation of gasoline and methanol fuelled spark ignition engines under Canadian winter conditions.
Gardiner, D.P., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.105-114, 31 refs.
Cold weather operation, Engines.

46-2891
Optimizing three-way catalyst emission control system for low ambient temperature operations.
Laurikko, J., Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.115-122, 25 refs.
Engines, Cold weather operation, Air pollution, Low temperature tests.

46-2892
Some aspects on the function of the after-market catalyst in Finnish urban traffic.
Aitta, E., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.123-129.
Haataja, M., Halme, K.
Motor vehicles, Air pollution, Cold weather operation, Carburetors.

46-2893
Emissions and fuel consumption at FTP test cycles at +22C and -2C from vehicles equipped with block heaters.
Laveskog, A., Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.131-138.
Cold weather performance, Motor vehicles, Air pollution.

46-2894
Fast auxiliary defrosting/heating system.
Boltz, N., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.139-147.
Renner, M., Koch, P.
Motor vehicles, Heating, Defrosting, Cold weather operation, Coolants.

46-2895
Protection of glazing of vehicle cabins from frosting up in conditions of low temperatures (up to minus 60C).
Reznichenko, V.A., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.149-159.
Ospelnikov, V.F.
Countermeasures, Cold weather operation, Frost protection, Motor vehicles.

46-2896
New heating and air conditioning system for a new generation of vehicles.
Bartsch, E., Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.161-172.
Motor vehicles, Cold weather operation, Heating, Air conditioning.

46-2897
Effect of texture of iced road surface on characteristics of ice and snow tires.
Shimizu, K.I., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.173-181, 6 refs.
Nihei, M., Dorémieux, F.
Tires, Roads, Ice surface, Rubber ice friction, Surface roughness.

46-2898
Mobility of four track steering vehicles on snow surface.
Kitano, M., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.183-189, 2 refs.
Watanabe, K.
Tracked vehicles, All terrain vehicles, Mathematical models, Snow surface.

46-2899
System approach to safe winter driving considerations: the visual system.
Niemi, P.R., Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.191-197, 38 refs.
Cold weather operation, Safety, Frost

46-2900
Study of automotive gear lubrication at low temperatures.
Kytö, M., Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.199-206, 3 refs.
Cold weather performance, Lubricants, Motor vehicles, Low temperature tests.

46-2901
Factors affecting pumpability and cold cranking in heavy duty diesel truck engines at low ambient temperatures—part II.
Alexander, A.G., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.207-216, 11 refs.
May, C.J., Smith, C.R.
Diesel engines, Cold weather operation, Cold weather performance, Motor vehicles, Viscosity.

46-2902
Importance of lubricant low temperature performance to vehicle operation or "will it still go when it's 30 below?".
May, C.J., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.217-223, 15 refs.
Smith, C.R.
Cold weather operation, Cold weather performance, Motor vehicles, Lubricants, Low temperature tests.

46-2903
Development of vehicle design criteria for cold weather operation.
Leier, T.E., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.225-228.
Winger, H.W.
Cold weather operation, Motor vehicles, Design criteria.

46-2904
Evaluation of adaptability of construction of automotive vehicles towards operations in northern conditions as per test results.
Bezverchil, S.F., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.229-241.
Maramashkin, A.V.
Cold weather operation, Motor vehicles, Design criteria.

46-2905
Scientific bases of the adaptation of automobiles for winter conditions of exploitation.
Reznick, L.G., Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.243-253, 5 refs.
Motor vehicles, Cold weather operation.

46-2906
Optimum working regime of liquid automatic heaters in northern conditions.
Maramashkin, A.V., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.255-262.
Mishenkov, V.A., Svetlitsnil, A.A.
Cold weather operation, Motor vehicles, Diesel engines, Engines, Heating.

46-2907
Optimum use of water heating systems—new control concept in the heating systems of liquid-cooled commercial vehicle engines, for optimum use of the installed heating capacity of engine-independent water heaters.
Schmalenbach, D., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.263-268.
Humburg, M.
Cold weather operation, Motor vehicles, Engines, Heat capacity, Heating.

46-2908
Diesel engine cold starting: white smoke.
Zahdeh, A.R., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.269-280, 12 refs.
Henein, N.A.
Diesel engines, Cold weather operation, Fuels.

46-2909
Cold start properties of diesel fuel blends with varying low end volatility and cetane number.
Buchsbaum, A., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.281-288, 8 refs.
Zeiner, W.
Fuels, Diesel engines, Cold weather performance, Fuel additives.

46-2910
Diesel fuel heaters for arctic vehicles.
Poliakov, IU.T., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.289-296, 6 refs.
Valeev, D.Kh.
Motor vehicles, Cold weather operation, Diesel engines, Heating, Electric heating.

46-2911
Influence of fuel additives on the cold climate operation of diesel engines.
Dale, D.L.E., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.297-304, 8 refs.
Williams, D.
Fuel additives, Diesel engines, Cold weather operation.

46-2912
Ignition delay and emissions characteristics of a methanol-diesel fueled engine at low charge temperatures.
Varde, K.S., Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.305-313, 19 refs.
Diesel engines, Cold weather operation, Cold weather performance.

46-2913
Study on the possibility of facilitating internal combustion engine starting at very low temperatures.
Gabriel, A., Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.315-319, 6 refs.
Cold weather operation, Cold weather performance, Engines.

46-2914
***Cold start performance comparison of alcohol fueled* engines with in-cylinder and port fuel injection.**
Quissek, F., et al, Subzero Engineering Conditions Conference, Helsinki, Finland, Feb. 3-6, 1992. Proceedings, Warrendale, PA, Society of Automotive Engineers, Feb. 1992, p.321-329, 14 refs.
Zelenka, P., Hulak, K., Kapus, P.
Cold weather performance, Engines.

46-2915
Thermal conductivities of a clathrate with and without guest molecules.
Zakrzewski, M., et al, *Physical review B*, Feb. 1, 1992, 45(6)II, p.2809-2817, 56 refs.
White, M.A.
Solids, Clathrates, Low temperature research, Thermal conductivity, Molecular structure, Temperature measurement, Temperature effects, Resonance.

46-2916
On the use of an artificial snow platform for WAM tests.
Albert, D.G., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Jan. 1992, SR 92-02, 11p., ADA-247 868, 8 refs.
Military operation, Mines (ordnance), Snow (construction material), Snow acoustics, Wave propagation, Sound waves.
An experiment was conducted to test the effectiveness of using a small platform constructed of packed snow to simulate the effects of a snow cover on ground sensors used in vehicle detection and identification. A simple impulsive acoustic source (.45-caliber pistol firing blanks) was used to simplify the interpretation of the experimental measurements. Geophones and microphones on the snow platform and on undisturbed snow nearby were used to record the signals. These measurements show no significant difference between signals recorded on the snow platform and on the surrounding undisturbed snow. Consideration of previous measurements and acoustic theory shows that the platform would have to be much larger in areal extent to affect the recorded signatures; it is the interaction of the acoustic waves with the ground surface over their entire propagation path that controls the properties of the signal at the ground sensor.

46-2917
Historical perspectives in frost heave research: the early works of S. Taber and G. Beskow.
Black, P.B., ed, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1991, SR 91-23, 169p., ADA-247 395, Refs. passim.
Hardenberg, M.J., ed.
Frost heave, Soil physics, Pavements, Soil freezing, Hoarfrost, Soil mechanics, Roads, Railroads, History, Analysis (mathematics), Permeability, Capillarity, Temperature gradients, Ground water.
This report contains a historical perspective of frost heave research conducted in North America and Europe since the early 1900s, and, in the interest of making some classic works on the mechanics of frost heave available in one document, Stephen Taber's two papers entitled Frost Heaving (1929) and The Mechanics of Frost Heaving (1930) published in the Journal of Geology, and J.O. Osterberg's translation of Gunnar Beskow's monograph, Soil Freezing and Frost Heaving with Special Attention to Roads and Railroads (1935).

46-2918
Field measurements of heat losses from three types of heat distribution systems.
Phetteplace, G.E., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Nov. 1991, SR 91-19, 33p., ADA-247 460, 12 refs.
Kryska, M.J., Carbee, D.L.
Heat loss, Temperature measurement, Heat pipes, Heating, Heat flux, Thermal insulation, Thermocouples, Analysis (mathematics).
The actual level of heat losses from operating heat distribution systems is not well known. The effect of the type of distribution system and the length of time in service in heat losses are also not known, and methods used to calculate heat losses have not been adequately verified. *This report describes a field project* at Ft. Jackson, SC, which addresses these needs. At Ft. Jackson three different types of systems have been instrumented: shallow concrete trench, steel conduit with supply and return in common conduit, and separate conduits for supply and return pipes. The heat losses from these systems are being monitored using several methods. Data have been collected from these sites for over four years, and some of the initial results are presented.

46-2919
Simulation of oil slick transport in Great Lakes connecting channels: user's manual for the River Oil Spill Simulation model (ROSS).
Shen, H.T., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1991, SR 91-29, 94p., ADA-247 845, 6 refs.
Yapa, P.D., Petroski, M.E.
Models, Computerized simulation, Oil spills, Channels (waterways), Ice cover effect, Environmental impact, Ice conditions, River flow.
The growing concern over the impacts of oil spills on aquatic environments has led to the development of many computer models for simulating the transport and spreading of oil slicks in surface water. Almost all of these models were developed for coastal environments. In this study, two computer models, named ROSS and LROSS, were developed for simulating oil slick transport in rivers and lakes, respectively. This report explains how to use ROSS.

46-2920
Decontamination in the cold using dry powders; studies with chemical agent simulants.
Heeremans, M.F., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1991, SR 91-26, 18p., ADB-162 262, 19 refs.
Parker, L.V.
Cold weather operation, Cold weather performance, Military operation.
Current U.S. Army procedures for decontaminating surfaces that have been contaminated with chemical warfare agents utilize chemical neutralization techniques that involve using liquids at subfreezing temperatures and also usually involve using water rinses. Because of the obvious problems associated with using water or any liquid at subfreezing temperatures, this report examines using absorbent powders for decontamination at low temperatures. Wiping contaminated surfaces with paper towels was compared with applying a dry powder and then wiping it off. Four powders (Fuller's earth, sand, garden soil, and talc) were tested on both clean and dirty painted and unpainted surfaces at temperatures as low as -29 C. Two chemical agent simulants were used for this portion of the testing: a *neat agent simulant* (BIS) and a thickened agent simulant (tDEM). Generally, these decontamination procedures became much more effective at low temperatures than they were at room temperature. A relatively quick procedure for decontaminating smaller equipment was developed using Fuller's earth.

46-2921
Evaluation of PVDF piezopolymer for use as a shock gauge.
Dutta, P.K., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, June 1990, SR 90-23, 11p., ADA-225 955, 7 refs.
Kalafut, J.
Polymers, Shock waves, Stresses, Frozen ground mechanics, Measuring instruments.
Polarized polyvinylidene fluoride film (PVDF) is a unique piezoelectric material with a very high sensitivity to shock pressure. It is also highly pliable. A large number of shock gauges were fabricated using this material; they were then calibrated and evaluated in the Split Hopkinson Pressure Bar Apparatus. Shock waves of defined geometry were passed through these test gauges and their responses were measured. Application of these gauges is foreseen in ground shock measurements where stress perturbations because of gauge inclusion in the media have to be minimized. This report discusses the development, construction and evaluation of these gauges.

46-2922
Testing of a deicing fluid foam formulation for decontamination at low temperatures.
Walsh, M.E., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1991, SR 91-28, 6p., ADB-162 209, 8 refs.
Parker, L.V.
Ice removal, Ice prevention, Aircraft icing, Low temperature tests, Cold weather performance, Cold weather operation, Antifreezes.
Several foam formulations have been tested for feasibility as hasty decontaminants, and as a possible alternative to conventional chemical decontaminants. At higher ambient temperatures, foam decontaminants offer several advantages: they adhere well to vertical surfaces and they are thicker than conventional decontaminants, and thus can offer a barrier to agent desorption. They also are less logistically demanding and less damaging to materials than DS2. This report focusses on the use of one of these foam decontaminants (Reformulated Aircraft Deicing Fluid or RADF) for use at subfreezing temperatures. Tests run at -29 C revealed that this formulation is not a suitable alternative to DS2. The primary problem was that the components used to make it were frozen at this low temperature. While the components could be previously mixed at higher temperatures, these mixtures would either freeze or separate upon cooling. The amount of antifreeze added to the formulation could be increased to prevent freezing, but this did not yield an acceptable product. DS2 appears to be a much better product to use at subfreezing temperatures.

46-2923
Heat budget of arctic ice in the winter.
Makshtas, A.P., Cambridge, UK, International Glaciological Society, Aug. 1991, 77p., 82 refs. For Russian original see 38-4138.
Heat balance, Heat transfer, Mathematical models, Sea ice distribution, Air ice water interaction, Polynyas, Ice cover effect, Heat transfer coefficient, Atmospheric circulation, Ice temperature, Water temperature, Air temperature.

46-2924
Trafficability evaluation of deep snowpack.
Irwin, G.J., et al, Regional North American Meeting of the ISTVS, 4th, Sacramento, CA, Mar. 25-27, 1992. Proceedings, Vol.2, Hanover, NH, International Society for Terrain-Vehicle Systems (ISTVS), 1992, p.259-265, 5 refs.
Xu, D.M., Mohamed, A.M.O., Yong, R.N.
Trafficability, Snow cover, Vehicles, Snow density, Mathematical models.

46-2925
Adaptation of the tracked vehicle performance model NTVPM to NATO requirements.
Wong, J.Y., et al, Regional North American Meeting of the ISTVS, 4th, Sacramento, CA, Mar. 25-27, 1992. Proceedings, Vol.2, Hanover, NH, International Society for Terrain-Vehicle Systems (ISTVS), 1992, p.298-305, 9 refs.
Irwin, G.J.
Mathematical models, Tracked vehicles, Military operation, Computerized simulation, Snow compaction.

46-2926
Desalination of sea water. [Opresnenie morskoi vody].
Slesarenko, V.N., Moscow, Energoatomizdat, 1991, 278p., In Russian. 130 refs.
Desalting, Sea water, Sea water freezing, Artificial freezing, Analysis (mathematics).

46-2927
Determining avalanche snow loads. [Opredelenie lavinnykh nagruzok].
Blagoveshchenskiĭ, V.P., Alma-Ata, Gylym, 1991, 115p., In Russian. 148 refs.
Countermeasures, Snow loads, Avalanche forecasting, Avalanche mechanics, Avalanche deposits, Avalanche engineering, Snow accumulation, Avalanche modeling, Avalanche tracks.

46-2928
Agro-ecological potential of mountain agriculture in northern Tien Shan. [Agroekologicheskiĭ potentsial gornogo zemledeliia severnogo Tian'-Shania].
Diusenbekov, Z.D., Alma-Ata, Gylym, 1990, 142p., In Russian. Refs. 137-141.
Cryogenic soils, Agriculture, Mountain soils, Ecology.

46-2929
Geothermy of the permafrost zone of the lithosphere in northern Asia. [Geotermiia merzlot zony litosfery severa Azii].
Balobaev, V.T., Novosibirsk, Nauka, 1991, 192p., In Russian. Refs. p.178-192.
Geothermy, Geocryology, Lithology, Frozen rocks, Frozen rock temperature, Snow cover effect, Heat flux, Pleistocene, Paleoclimatology, Analysis (mathematics), Statistical analysis.

46-2930
Surging and calving glaciers in Eastern Svalbard.
Lefauconnier, B., et al, *Oslo. Norsk Polarinstitutt. Meddelelser*, Oct. 1991, No.116, 130p. + map, 52 refs.
Hagen, J.O.
Glacier surges, Glacier surveys, Calving.

46-2931
Radiation measurements in Ny-Alesund, Spitsbergen 1981-1987.
Hisdal, V., et al, *Oslo. Norsk Polarinstitutt. Meddelelser*, Jan. 1992, No.118, 380p., 8 refs.
Finnekasa, Ö., Vinje, T.
Radiation, Solar radiation, Ultraviolet radiation, Radiation balance, Radiation measuring instruments, Snow melting, Tundra, Albedo.

46-2932
Observation of free hydroxyl groups on the surface of ultra thin ice layers on Ni(110).
Callen, B.W., et al, *Surface science letters*, Jan. 15, 1992, 261(1-3), p.L44-L48, 11 refs.
Griffiths, K., Norton, P.R.
Ice physics, Molecular structure, Ice spectroscopy, Hydrogen bonds, Absorption, Deuterium oxide ice, Surface properties, Low temperature research.

46-2933
Large perturbations of ammonium and organic acids content in the Summit-Greenland ice core. Fingerprint from forest fires?.
Legrand, M., et al, *Geophysical research letters*, Mar. 3, 1992, 19(5), p.473-475, 15 refs.
Ice cores, Drill core analysis, Forest fires, Biomass, Atmospheric composition, Age determination, Precipitation (meteorology), Chemical analysis.

46-2934
Radar study of the snowfall in south-west Cornwall on 12 January 1987.
Pike, W.S., *Meteorological magazine*, May 1990, 119(1414), p.97-102, 5 refs.
Snowfall, Snow accumulation, Radar echoes, Precipitation (meteorology), Synoptic meteorology, Radiometry, Weather forecasting.

46-2935
Sodar observations of the stable lower atmospheric boundary layer at Barrow, Alaska.
Cheung, T.K., *Boundary-layer meteorology*, Nov. 1991, 57(3), p.251-274, 29 refs.
Atmospheric composition, Sounding, Temperature inversions, Stratification, Ice air interface, Boundary layer, Stability, Time factor, Snow cover effect.

46-2936
Late Cenozoic glacial history of the Terra Nova Bay region, northern Victoria Land, Antarctica.
Orombelli, G., et al, *Antarctic Journal of the United States*, 1990, 25(5), p.51-52, 7 refs.
Denton, G.H.
Glacial geology, Glacial deposits, Glacier surfaces, Ice sheets, Antarctica—Terra Nova Bay.
In Jan. and Feb. 1989 and 1990 an investigation was carried out to examine past longitudinal profiles of outlet glaciers that drained through the Transantarctic Mountains into Terra Nova Bay. A well defined erosional trimline with distinct upper and lower limits is etched into alpine ridges and spurs on valley walls alongside Reeves, Priestley, and Campbell Glaciers. A figure shows that Reeves Glacier was thicker along its entire length when it stood at the Terra Nova drift limit, with the greatest thickening in coastal regions where grounded ice filled the Terra Nova Bay. Analysis of the illustration leads to the conclusion that the trimline may be metachronous: old near the coast and Late Wisconsin, and even Early Holocene, in the interior.

46-2937
Surficial geology of Sessrumir Valley, western Asgard Range, Antarctica: implications for late Tertiary ice-sheet overriding.
Marchant, D.R., et al, *Antarctic Journal of the United States*, 1990, 25(5), p.53-55, 11 refs.
Denton, G.H., Sugden, D.E.
Glacial geology, Glacial erosion, Paleoclimatology, Ice sheets, Antarctica—Sessrumir Valley.
Information based on the surficial stratigraphy and morphologic features of Sessrumir Valley, western Asgard Range, is presented. Two points are clear from the study: the surficial geology of Sessrumir Valley records alternating periods of glaciation and ice-free conditions, with important segments of the record dating to Early Pliocene and perhaps even pre-Pliocene times. No evidence is found of significantly warmer-than-present climates preserved in the stratigraphic record of Sessrumir Valley. The valley shows strong evidence of at least 2 periods of northeastward glacial overriding of the western Asgard Range. An early overriding event is inferred from the Sessrumir till. A younger overriding event is inferred from subglacial channels that are incised in the eastern bedrock spur and Asgard till of Sessrumir Valley.

46-2938
Subglacial meltwater system, Sessrumir Valley, western Asgard Range, Antarctica.
Sugden, D.E., et al, *Antarctic Journal of the United States*, 1990, 25(5), p.56-58, 8 refs.
Marchant, D.R., Denton, G.H.
Paleoclimatology, Subglacial observations, Meltwater, Ice sheets, Antarctica—Sessrumir Valley.
The pattern and morphology of channels and potholes has revealed the existence of subglacial meltwater systems in the Asgard Range. Three points were made clear by the study: the pattern of the channels is consistent with the hypothesis of overriding ice from the southwest; the relationship of the channels to the underlying topography implies that the main features, such as the butte, were present before the overriding glaciation; and wind action accounts for the detailed morphology within the channel system, including fretting, sand dunes, and ripples.

46-2939
Short-term variations in the flow of ice stream B, Antarctica.
Harrison, W.D., et al, *Antarctic Journal of the United States*, 1990, 25(5), p.77-79, 5 refs.
Echelmeyer, K.E.
Ice sheets, Strain tests, Glacier flow, Ice pressure, Antarctica—Siple Coast.
High-resolution vertical strain rate measurements were carried out at 3 sites separated by distances of typically 3 km, at ice depths of about 60 m, on ice stream B in 1988-1990, with time resolution of 1 h. The strain resolution was usually 2 ppm and was measured with resistance wires about 1 m long. Data are shown in figures, with diurnal oscillation in the strain rate as the most striking feature.

46-2940
Ice flow on deforming sediments: Ice stream B—and Lake Michigan?.
Alley, R.B., *Antarctic Journal of the United States*, 1990, 25(5), p.79-80, 5 refs.
Glacier flow, Basal sliding, Ice models, Antarctica—Siple Coast.
On the theory of the existence of a deforming bed beneath ice stream B, a possible one-dimensional steady model for basal behavior, consistent with available data favoring the deforming bed hypothesis, is discussed. The ice streaming dynamics suggested by the model are described; the possibility is contemplated that ice stream B and the Lake Michigan lobe may be quite similar in ice and sediment dynamics.

46-2941
Borehole geophysical observations on ice stream B, Antarctica.
Engelhardt, H., et al, *Antarctic Journal of the United States*, 1990, 25(5), p.80-82, 4 refs.
Humphrey, N., Kamb, B.
Boreholes, Glacier flow, Borehole instruments, Basal sliding, Antarctica—Siple Coast.
Geophysical experiments and observations made in 6 boreholes about 1,060 m deep, drilled on ice stream B in the 1989-1990 season, are discussed from the following points of interest: sampling of subglacial material, till thickness, ice deformation, till deformation, basal sliding, and basal water pressure and hydraulic conductivity.

46-2942
Studies of internal layering and bedrock topography on ice stream C, West Antarctica.
Jacobel, R.W., et al, *Antarctic Journal of the United States*, 1990, 25(5), p.82-85, 5 refs.
Hodge, S.M., Wright, D.L.
Bottom topography, Glacier thickness, Mapping, Antarctica—West Antarctica.
During the 1987-1989 field seasons, surface-based ice radar profiling studies were done on ice streams B and C. This article summarizes progress to date on the analysis of a portion of the data acquired near the Upstream C camp in 1988-1989. One of the figures presented shows a contour map and mesh diagram of ice thickness beneath the center portion of the strain grid. Because the surface elevations change by only a few meters in this area, it is also a good approximation of the bedrock topography. A strong correlation is found between the bedrock topography and surface features and velocities in the area, even though ice stream C is nearly stagnant. A second focus of the investigation concerns the internal layering, a figure typical of most of the data shows deformation of the internal layers of ice stream C which bears no simple relation to the bed or surface topography.

46-2943
Analysis of seismic data from ice stream C.
Bentley, C.R., et al, *Antarctic Journal of the United States*, 1990, 25(5), p.86-88, 6 refs.
Anandakrishnan, S., Atre, S.R., Munson, C.G.
Glacier flow, Seismic reflection, Seismic refraction, Subglacial observations, Ice models, Antarctica—West Antarctica.
A report is presented on analyses of seismic data collected around Upstream C camp during the 1988-1989 austral summer. Microearthquake activity near the camp, monitored on a 7 by 4 km array, was characterized by swarms of events separated by quiet periods. From the total activity, it is estimated that at least 5% of the ice stream motion is due to slip and faults. Secondary arrivals from the microearthquakes provided information about the Earth structure beneath ice stream C, and a travel-time plot formed from the P-wave seismograms for 15 events is illustrated. Data analysis suggests that ice stream C is underlain by a low velocity sedimentary layer whose thickness, based on an assumed velocity of 2 km/s, is approximately 400 m.

46-2944
Analysis of radar data.
Bentley, C.R., et al, *Antarctic Journal of the United States*, 1990, 25(5), p.88-90, 3 refs.
Retzlaff, R., Novick, A.N., Lord, N.
Airborne radar, Data processing, Radar echoes, Glacier ice, Crevasses, Mapping, Antarctica—Siple Coast.
During the 1987-1988 summer, a fading pattern experiment was performed at Down B camp on the ice plain of ice stream B, consisting of repeated radar reflection profiles. The purpose of the experiment was to determine the differential movement rates between the surface and bed of the ice stream at a location on the ice plain. During the 1988-1989 summer, an airborne radar was flown over much of the upstream portions of ice streams B and C. A short pulse radar was deployed on 5 profiles across the buried shear margin of ice stream C to determine the depth of buried crevasses, which were detected everywhere along the tens of kilometers of lines profiled in the vicinity of Upstream C.

46-2945
Glaciological observations on Dyer Plateau, Antarctic Peninsula.
Raymond, C.F., et al, *Antarctic Journal of the United States*, 1990, 25(5), p.90-92, 2 refs.
Weertman, B.R.
Ice sheets, Geodetic surveys, Ice cores, Radio echo soundings, Paleoclimatology, Antarctica—Dyer Plateau.
To obtain paleoclimatic data from near latitude 70S in the Antarctic Peninsula, in 1989-1990 a field program was carried out on the crest of Dyer Plateau which included ice coring to 235 m depth, near surface sampling in pits, and various geophysical measurements summarized in this article. Geophysical measurements included geodetic surveying of an extensive marker network, satellite location of 3 markers, radio echo sounding traverses, marking of core holes for vertical strain measurement, and snow accumulation.

46-2946
Detailed glaciochemical investigations in southern Victoria Land, Antarctica—a proxy climate record.
Mayewski, P.A., *Antarctic Journal of the United States*, 1990, 25(5), p.93, 5 refs. For another version see 18B-41174.
Paleoclimatology, Ice cores, Glacier thickness, Antarctica—Newall Glacier.
During the 1987-1988 austral field season, several sites in southern Victoria Land were investigated as potential core sites. The site chosen for investigation during the 1988-1989 season was the Newall Glacier in the Asgard Range. The major goal of the 1988-1989 field program was the collection of two cores, 150 and 175 m deep, respectively.

46-2947
Ice movement and mass balance at the Allan Hills Icefield.
Schultz, L., et al, *Antarctic Journal of the United States*, 1990, 25(5), p.94-95, 9 refs.
Annexstad, J.O., Delisle, G.
Glacier ablation, Glacier mass balance, Velocity measurement, Antarctica—Allan Hills.
In an attempt to provide a quantitative measure of ablation and ice flow, a triangulation network across the Allan Hills Icefield was established in 1978. The mean annual ablation rate of about 4.5 cm/y, measured in 1988, is found to be comparable to that measured in previous years. The horizontal ice movement of the individual stations is shown in a figure. At the most westerly stations, the ice moves about 60 cm/y in an almost northern direction. Most of the meteorites found are where ice velocities drop to less than 8 cm/y.

46-2948
Ice fabric in the Reckling Moraine.
Elliot, R.J., et al, *Antarctic Journal of the United States*, 1990, 25(5), p.96-97, 5 refs.
Faure, G.
Ice crystal structure, Ice deformation, Ice models, Antarctica - Victoria Land.
The vertical alignment of crystals in the ice under the Reckling Moraine suggests that the ice has been rotated about 90 deg into a vertical orientation, just as predicted by a model of Whillans and Cassidy (1983). It is concluded that systematic studies of ice fabric may yield useful information about the structural deformation of ice sheets whose flow is disturbed by bedrock obstructions.

46-2949
North Greenland glacier velocities and calf ice production.
Higgins, A.K., *Polarforschung*, 1990(Publ. 1991), 60(1), p.1-23, With German summary. 18 refs.
Glacier flow, Glaciers, Calving, Greenland.

46-2950
Melting rates at the bottom of Filchner-Ronne Ice Shelf, Antarctica, from short-term mass-balance studies.
Determann, J., et al, *Polarforschung*, 1990(Publ. 1991), 60(1), p.25-32, With German summary. 15 refs.
Grosfeld, K., Ritter, B.
Ice shelves, Ice melting, Mass balance, Ice mechanics, Antarctica--Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
Field studies which were performed in 1990 on a strain network yielded all quantities which are necessary to solve the mass-conservation equation with respect to the melting rate underneath the Filchner-Ronne Ice Shelf. The network was located about 30 km inland from the ice front and about 50 km northwest of Filchner Station. Repeated electrooptical distance measurements, direction observations and absolute positioning using satellite methods (GPS), determined strain rates and ice-flow velocities. Ice thickness and ice thickness gradients were obtained by hot-water drilling and electromagnetic reflection soundings (EMR), respectively. Surface accumulation rates were taken from measurements in snow pits. Due to the high precision of the field techniques, about one month between observations was sufficient to estimate a melting rate of 1.5 m/a within 0.15 m/a of accuracy. (Auth.)

46-2951
Search for the Tunguska event relics in the antarctic snow and new estimation of the cosmic iridium accretion rate.
Rocchia, R., et al, *Geological Society of America. Special paper*, 1990, Global catastrophes in earth history; an interdisciplinary conference on impacts, volcanism, and mass mortality. Edited by V.L. Sharpton and P.D. Ward., p.189-193, 14 refs.
Snow composition, Chemical composition, Antarctica—Amundsen-Scott Station.
A careful search for iridium in snow-ice samples deposited in Antarctica by the time of the great Tunguska explosion in 1908 has produced negative results. The worldwide dispersion of the cosmic bolide responsible for the event has not left a detectable Ir imprint in South Pole snow. The iridium infall from the Tunguska event is at least a factor of 20 lower than previously estimated. The local iridium background, averaged over a period of 30 years, is consistent with a global micrometeorite flux of about 10 Gg per year. (Auth.)

46-2952
Sensitivity experiments for polar low forecasting with the CMC mesoscale finite-element model.
Roch, M., et al, *Atmosphere-ocean*, Sep. 1991, 29(3), p.381-419, With French summary. 22 refs.
Benoit, R., Parker, N.
Weather forecasting, Atmospheric disturbances, Air masses, Air flow, Ice air interface, Ice cover effect, Marine atmospheres, Marine meteorology, Mathematical models.

46-2953
Graupel growth and trajectories in a shallow Cb cloud determined by a forced 1-D model.
Ćurić, M., et al, *Atmosphere-ocean*, Sep. 1991, 29(3), p.462-478, With French summary. 20 refs.
Janc, D.
Snow pellets, Hailstone growth, Precipitation (meteorology), Cloud physics, Ice air interface, Air flow, Mathematical models, Thermodynamics.

46-2954
Evaluating the water resource impacts of climatic warming in cold alpine regions by the water balance model: modelling the Urumqi River basin.
Lai, Z.M., et al, *Science in China—Ser.B*, Nov. 1991, 34(11), p.1362-1371, 16 refs.
Ye, B.S.
River basins, Ground thawing, Watersheds, Climatic changes, Glacier melting, Water balance, Runoff forecasting, Mathematical models, Alpine glaciation, Global warming, China—Urumqi River.

46-2955
New model of frost heave predictions for clayey soils.
Chen, X.B., et al, *Science in China—Ser.B*, Oct. 1991, 34(10), p.1225-1236, 9 refs. For another version see 45-3426.
Wang, Y.Q.
Clay soils, Frost heave, Frost forecasting, Frost penetration, Soil freezing, Mathematical models, Soil tests, Frozen ground thermodynamics.

46-2956
Temperature changes and thaw of permafrost adjacent to Richards Island, Mackenzie Delta, N.W.T.
Dyke, L.D., *Canadian journal of earth sciences*, Nov. 1991, 28(11), p.1834-1842, With French summary. 33 refs.
Ground thawing, Permafrost transformation, Subsea permafrost, Degradation, Marine geology, Thawing rate, Shoreline modification, Active layer, Water temperature.

46-2957
On the formation of large subglacial lakes.
Shoemaker, E.M., *Canadian journal of earth sciences*, Dec. 1991, 28(12), p.1975-1981, With French summary. 35 refs.
Glacial hydrology, Pleistocene, Glacial lakes, Subglacial observations, Glacier melting, Water storage, Glacier beds, Lake bursts, Topographic effects.

46-2958
Environmental regulation of nitrogen fixation in a high arctic lowland ecosystem.
Chapin, D.M., et al, *Canadian journal of botany*, Dec. 1991, 69(12), p.2744-2755, With French summary. 48 refs.
Bliss, L.C., Bledsoe, L.J.
Arctic landscapes, Ecosystems, Nutrient cycle, Bacteria, Biomass, Soil microbiology, Vegetation patterns, Canada—Northwest Territories—Devon Island.

46-2959
Thermal stability of near-surface ground ice on Mars.
Paige, D.A., *Nature*, Mar. 5, 1992, 356(6364), P.43-45, 32 refs.
Extraterrestrial ice, Ground ice.

46-2960
Environmental change in Iceland: past and present.
Maizels, J.K., ed, Glaciology and quaternary geology, Vol.7, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, 332p., Refs. passim. For selected papers see 46-2961 through 46-2971.
Caseldine, C., ed.
DLC QE698.E58 1991
Paleoclimatology, Climatic changes, Sediments, Glacier oscillation, Moraines, Lichens, Radioactive age determination, Mountain glaciers, Rock glaciers, Stratigraphy, Iceland.

46-2961
***Review of the Late Weichselian and early Holocene* glacial and environmental history of Iceland.**
Ingólfsson, Ó., Environmental change in Iceland: past and present. Edited by J.K. Maizels and C. Caseldine, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.13-29, Refs. p.25-29.
Paleoclimatology, Climatic changes, Vegetation, Iceland.

46-2962
Review of the glaciation maximum concept and the deglaciation of the Eyjafjördur, North Iceland.
Norddahl, H., Environmental change in Iceland: past and present. Edited by J.K. Maizels and C. Caseldine, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.31-47, Refs. p.45-47.
Glaciation, Sea level, Glacier flow, Paleoclimatology, Glacial lakes, Polynyas, Iceland—Eyjafjördur.

46-2963
Weichselian glacial history of West Melrakkaslétta, northeastern Iceland.
Pétursson, H.G., Environmental change in Iceland: past and present. Edited by J.K. Maizels and C. Caseldine, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.49-65, Refs. p.64-65.
Paleoclimatology, Glacier oscillation, Geomorphology, Sediments, Stratigraphy, Iceland—West Melrakkaslétta.

46-2964
Revised model of Weichselian deglaciation in south and south west Iceland.
Hjartarson, Á., Environmental change in Iceland: past and present. Edited by J.K. Maizels and C. Caseldine, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.67-77, 21 refs.
Paleoclimatology, Moraines, Radioactive age determination, Iceland.

46-2965
New observations on the postglacial glacial history of Tröllaskagi, northern Iceland.
Stötter, J., Environmental change in Iceland: past and present. Edited by J.K. Maizels and C. Caseldine, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.181-192, Refs. p.190-192.
Paleoclimatology, Mountain glaciers, Moraines, Iceland—Tröllaskagi.

46-2966
Holocene glacial history of the Hörgárdalur area, Tröllaskagi, northern Iceland.
Häberle, T., Environmental change in Iceland: past and present. Edited by J.K. Maizels and C. Caseldine, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.193-202, 14 refs.
Paleoclimatology, Radioactive age determination, Lichens, Iceland—Tröllaskagi.

46-2967
Dating recent glacier advances in the Svarfadardalur-Skídadalur area of northern Iceland by means of a new lichen curve.
Kugelmann, O., Environmental change in Iceland: past and present. Edited by J.K. Maizels and C. Caseldine, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.203-217, Refs. p.215-217.
Paleoclimatology, Lichens, Glacier oscillation, Sea ice, Iceland—Svarfadardalur-Skídadalur.

46-2968
Lichenometric dating, lichen population studies and *Holocene glacial history in Tröllaskagi, northern* Iceland.
Caseldine, C., Environmental change in Iceland: past and present. Edited by J.K. Maizels and C. Caseldine, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.219-233, Refs. p.232-233.
Lichens, Paleoclimatology, Moraines, Iceland—Tröllaskagi.

46-2969
Glacier fluctuations and rock glaciers in Tröllaskagi, northern Iceland, with special reference to 1946-1986.
Martin, H.E., et al, Environmental change in Iceland: past and present. Edited by J.K. Maizels and C. Caseldine, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.255-265, 33 refs.
Whalley, W.B., Caseldine, C.
Rock glaciers, Glacier oscillation, Climatic changes, Temperature effects, Iceland—Tröllaskagi.

46-2970
Origin and evolution of Holocene sandur deposits in areas of jökulhlaup drainage, Iceland.
Maizels, J.K., Environmental change in Iceland: past and present. Edited by J.K. Maizels and C. Caseldine, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.267-302, Refs. p.299-302.
Drainage, Outwash, Meltwater, Runoff, Sediments, Sands, Stratigraphy, Iceland.

46-2971
Sediment and solute yield from the Jökulsá á S Ófolheimasandi glacierized river basin, southern Iceland.
Lawler, D., Environmental change in Iceland: past and present. Edited by J.K. Maizels and C. Caseldine, Dordrecht, Netherlands, Kluwer Academic Publishers, 1991, p.303-332, Refs. p.329-332.
Suspended sediments, Glacial rivers, River basins, Sediment transport, Glacial erosion, Iceland—Jökusá á Sólheimasandi.

46-2972
Delta O-18 of atmospheric O2 from air inclusions in the Vostok ice core: timing of CO2 and ice volume changes during the penultimate deglaciation.
Sowers, T., et al, *Paleoceanography*, Dec. 1991, 6(6), p.679-696, Refs. p.694-696.
Ice cores, Ice composition, Climatic changes, Atmospheric composition, Ice volume, Antarctica—Vostok Station.
A record of atmospheric CO2 variations over the last 160,000 years has recently been constructed by analyzing the trapped gas in the Vostok ice core. The relationship between changes in atmospheric CO2 and the size of the continental ice sheets has been difficult to ascertain, because the CO2 record is obtained from ice cores while the ice volume record has been constructed from the stable isotopic composition of biogenic CaCO3 in deep-sea sediment cores. In order to compare these two records in a more precise manner, a record is presented of the isotopic composition (delta O-18) of atmospheric O2 trapped in the Vostok ice core, and it is proposed that it may be considered a proxy for the delta O-18 of seawater and hence ice volume. Having a record of atmospheric CO2 along with a continental ice volume proxy in trapped air in the same ice core allows one to compare the timing of changes in these two parameters with little uncertainty in the relative ages of important events. Results suggest that during the penultimate glacial termination, atmospheric CO2 began to increase at least 3 kyr

before the initial introduction of meltwater to the oceans. (Auth. mod.)

46-2973
Centrifugal chillers and glycol ice thermal storage units.
Harmon, J.J., et al, *ASHRAE journal*, Dec. 1991, 33(12), p.25-31, 2 refs.
Yu, H.C.
Ice makers, Ice refrigeration, Air conditioning, Cooling systems, Performance, Heat transfer, Design.

46-2974
Stable sulfur isotopes of sulfate in precipitation and stream solutions in a northern hardwood watershed.
Stam, A.C., et al, *Water resources research*, Jan. 1992, 28(1), p.231-236, 21 refs.
Mitchell, M.J., Krouse, H.R., Kahl, J.S.
Watersheds, Solutions, Hydrogeochemistry, Forest ecosystems, Isotope analysis, Snowmelt, Chemical properties, Air pollution.

46-2975
Electromagnetic field of a horizontal electric dipole in the presence of a three-layered region.
King, R.W.P., *Journal of applied physics*, June 15, 1991, 69(12), p.7987-7995, 7 refs.
Electric fields, Ice cover effect, Antennas, Remote sensing, Scattering, Sea ice, Electromagnetic properties, Analysis (mathematics), Submarines.

46-2976
Alpine and subalpine soil properties as paleoenvironmental indicators.
Dixon, J.C., *Physical geography*, Oct.-Dec. 1991, 12(4), p.370-384, 30 refs.
Paleoclimatology, Climatic changes, Soil analysis, Alpine glaciation, Mountain soils, Soil formation, Weathering, Quaternary deposits, Geomorphology.

46-2977
Ruggedized transducer subsystem for ice hazard detection sonar.
Van den Broeck, R., et al, *Transport Canada. Publication*, July 1991, TP 1191E, 21p. + appends., With French summary. 3 refs.
Ippoliti, G., Gorling, R.L.A.
Ice detection, Underwater acoustics, Ice navigation, Ice acoustics, Warning systems, Acoustic measurement, Electronic equipment, Icebreakers.

46-2978
Global climate change (GCC) issues and their impacts on the US Army Corps of Engineers.
Huntley, J.E., et al, *U.S. Army Corps of Engineers. Topographic Engineering Center. Special report*, Nov. 1991, TEC-SR-1, 124p., Refs. p.115-124.
Neander, J.E.
Global warming, Atmospheric circulation, Climatic changes, Paleoclimatology, Atmospheric composition, Models, Research projects, Hydrologic cycle, Legislation.

46-2979
Quantification and distribution of winter water within river systems of the 1002 area, Arctic National Wildlife Refuge.
Elliott, G.V., et al, *U.S. Fish and Wildlife Service. Alaska fisheries technical report*, Apr. 1990, No.6, 18p. + append., 15 refs.
Lyons, S.M.
River ice, Water reserves, Hummocks, Frost mounds, Naleds, Unfrozen water content, Water storage, United States—Alaska—Arctic National Wildlife Refuge.

46-2980
Deicing agents: a primer. *Public works*, July 1991, 122(8), p.50-51.
Road icing, Winter maintenance, Ice removal, Chemical ice prevention, Performance, Salting, Chemical composition, Environmental impact.

46-2981
Oklahoma DOT uses CMA in freezing rain. *Public works*, July 1991, 122(8), p.55-56.
Road icing, Ice storms, Ice control, Winter maintenance, Performance, Chemical ice prevention.

46-2982
Winter maintenance at airports requires a different approach.
Henderson, R.L., *Public works*, July 1991, 122(8), p.65.
Airports, Winter maintenance, Snow removal, Ice control.

46-2983
Simple interpretation scheme for data of polarization laser sounding of crystalline clouds.
Popov, A.A., et al, *Atmospheric optics*, Jan. 1990, 3(1), p.36-41, Translated from Optika atmosfery. 5 refs.
Shefer, O.V.
Cloud physics, Sounding, Lidar, Ice crystal optics, Backscattering, Atmospheric physics, Analysis (mathematics), Orientation.

46-2984
Snow: not much.
Ludlum, D.M., *Weatherwise*, Feb.-Mar. 1992, 45(1), p.47-50.
Weather observations, Snow accumulation, Snowfall, Seasonal variations, Meteorological data, United States.

46-2985
Hydroclimatic variability in the Rocky Mountains.
Changnon, D., et al, *Water resources bulletin*, Oct. 1991, 27(5), p.733-743, 20 refs.
McKee, T.B., Doesken, N.J.
Watersheds, Hydrology, Surface waters, Water storage, Runoff, Snow depth, Stream flow, Climatic factors, Seasonal variations, Topographic effects.

46-2986
On centrifuge use for ocean research.
Poorooshasb, F., *Marine geotechnology*, Apr.-June 1990, 9(2), p.141-158, 33 refs.
Test equipment, Ice strength, Stress concentration, Simulation, Gravity, Ice scoring, Oceanography, Ice solid interface, Ocean bottom, Offshore structures.

46-2987
In winter, the show must go on.
Vezetti, C.H., et al, *Public works*, Apr. 1991, 122(4), p.49-50.
Dean, J.J.
Road maintenance, Winter maintenance, Equipment, Cold weather operation, Snow removal.

46-2988
Snowfighter's motto: be prepared. *Public works*, Apr. 1991, 122(4), p.69-70,86, 1 ref.
Road maintenance, Winter maintenance, Snow removal, Equipment.

46-2989
Ecology of bottom ice algae: 1. Environmental controls and variability.
Cota, G.F., et al, *Journal of marine systems*, Aug. 1991, 2(3-4), p.257-277, Refs. p.274-277.
Legendre, L., Gosselin, M., Ingram, R.G.
Sea ice, Algae, Biomass, Ecology, Marine biology, Growth, Ice cover effect, Ice bottom surface, Radiance.
Over large ocean areas of the Arctic, Subarctic and Antarctic, which are covered by landfast sea ice during springtime, high concentrations of microalgae have been observed in the interstices of the lower margin of sea ice floes and, in some cases, in a thin layer of surface water immediately under the ice cover or associated with semi-consolidated frazil ice. Ice algal blooms enhance and extend biological production in polar waters by at least 1-3 months. Biomass accumulation of sea ice algal populations ultimately depends upon the duration of the growth season, which is largely a function of climatic and environmental variability. Although the occurrence of prolonged blooms of ice algae at the ice-water interface is a widespread phenomenon, there are important differences between the growth habits and environments of several well-studied sites. In this paper, recent observations from seasonal studies of these sites are compared and contrasted with an emphasis on how the dominant scales of environmental variability influence ice algal populations. (Auth. mod.)

46-2990
Ecology of bottom ice algae: 2. Dynamics, distributions, and productivity.
Cota, G.F., et al, *Journal of marine systems*, Aug. 1991, 2(3-4), p.279-295, Refs. p.293-295.
Smith, R.E.H.
Marine biology, Algae, Ecology, Distribution, Sea ice, Snow cover effect, Ice bottom surface, Light effects.
Although ice algal dynamics are closely related to irradiance, their dynamics and distributions are influenced by other abiotic and biotic factors. In this paper, environmental factors affecting ice algal abundance and productivity are considered, emphasizing recent results from several well-studied sites. Biomass accumulation, growth rates and productivity have been documented for spring blooms of bottom interstitial and sub-ice assemblages. Current methods of measuring productivity are compared. Results are consistently low but variable, with little systematic difference among them. At present, apparent differences in productivity between bottom ice assemblages in the Arctic and Antarctic, or among different antarctic assemblages, are so confounded by methodological and other sources of variability that no firm differences can be detected. (Auth. mod.)

46-2991
Ecology of bottom ice algae: 3. Comparative physiology.
Cota, G.F., et al, *Journal of marine systems*, Aug. 1991, 2(3-4), p.297-315, Refs. p.297-315.
Smith, R.E.H.
Sea ice, Algae, Biomass, Marine biology, Ecology, Physiological effects, Photosynthesis, Growth, Ice bottom surface, Ice cover effect.
In this paper, physiological responses of bottom ice algae to major environmental variables, including temperature, salinity, irradiance and nutrients, have been characterized. Photosynthesis vs. irradiance responses, photosynthate allocation and biochemical composition have been determined for vernal blooms. Ice algae normally exhibit relatively low maximal assimilation numbers (except at subpolar latitudes), but markedly higher photosynthetic efficiencies than planktonic diatoms; large low frequency fluctuations in photosynthetic performance are common during the later phases of blooms. Ice algae have relatively low photoadaptive indices and optimal irradiances, reflecting their lower average growth irradiance. Compared to phytoplankton, photosynthate allocation by ice algae is lower for protein, similar for lipid but higher for polysaccharide and metabolites at the same irradiance. In several respects the physiological behavior of ice algae appears to be fundamentally different from that of phytoplankton. (Auth. mod.)

46-2992
Modelling ice-edge phytoplankton bloom in the Scotia- Weddell Sea sector of the southern ocean during spring 1988.
Lancelot, C., et al, *Journal of marine systems*, Aug. 1991, 2(3-4), p.333-346, 33 refs.
Veth, C., Mathot, S.
Sea ice, Marine biology, Plankton, Biomass, Ice water interface, Growth, Mathematical models, Ice edge, Antarctica—Weddell Sea.
In this paper, a mathematical model is developed for calculating daily integrated growth of phytoplankton in the Scotia-Weddell Sea sector of the southern ocean from the knowledge of light regime, temperature and vertical structure of the water column. Coupling of this model with a one-dimensional hydrodynamical model, calculating the depth of the wind-mixed layer from meteorological data and ice cover, allowed simulation of the dynamics of phytoplankton development during the ice-retreat period in this sector of the Scotia-Weddell Sea. (Auth. mod.)

46-2993
Crystallographic structure of sea ice along a salinity gradient and environmental control of microalgae in the brine cells.
Legendre, L., et al, *Journal of marine systems*, Aug. 1991, 2(3-4), p.347-357, 30 refs.
Sea ice, Salinity, Ice growth, Algae, Biomass, Marine biology, Ice sampling, Ice crystal structure, Ice cores.

46-2994
Nutrient cycling and primary production in the marine systems of the Arctic and Antarctic.
Codispoti, L.A., et al, *Journal of marine systems*, Aug. 1991, 2(3-4), p.359-384, Refs. p.381-384.
Friederich, G.E., Sakamoto, C.M., Gordon, L.I.
Marine biology, Biomass, Nutrient cycle, Ecology, Oceanography.
In this paper, highly localized primary production events in both the Arctic and the Antarctic are examined, with the object of improving the accuracy of their estimation. Arctic primary production rates are being revised upwards because of a better spatial and temporal distribution of incubation experiments and a re-awakening of interest in estimating new production from the distribution of chemical variables. Similarly, recent examination of temporal changes in nitrate concentrations and recognition of the importance of ice-edge blooms has caused antarctic primary productivity to be revised upwards. In both the Arctic and the Antarctic, the ratio of "new" to total primary production is high, and neglect of this fact can lead to an underestimation of the potential that these regions have for influencing global cycles of bioactive chemicals. Because of the differences in geomorphology and stratification, global warming is likely to increase primary production in the Arctic and will probably decrease antarctic primary production. In addition to sharing high ratios of "new" to total primary production, high ammonium concentrations occur in the Arctic and Antarctic. It is possible that these accumulations arise from a strong repression of nitrification at low temperatures. (Auth. mod.)

46-2995
Nutrients and organic nitrogenous compounds in the marginal ice zone of the Fram Strait.
Kattner, G., et al, *Journal of marine systems*, Aug. 1991, 2(3-4), p.385-394, 32 refs.
Becker, H.
Sea ice, Water chemistry, Ice edge, Nutrient cycle, Biomass, Marine biology, Oceanography, Chemical analysis, Hydrography.

46-2996
Satellite remote sensing of the polar oceans.
Comiso, J.C., *Journal of marine systems*, Aug. 1991, 2(3-4), p.395-434, Refs. p.431-434.
Sea ice distribution, Spacecraft, Remote sensing, Sensors, Ice surveys, Oceanography, Geophysical surveys, Radiometry, Spaceborne photography.

This paper presents a review of past, present, and future satellite systems, methods and techniques of interpretation and potential applications to the study of the polar oceans. Among the satellite-borne sensors examined are passive sensors, typified by microwave and infrared radiometers, and active sensors, as represented by synthetic aperture radar. The performance of these instruments in the remote sensing of sea ice properties and biota, in both the Arctic and Antarctic, is emphasized. (Auth. mod.)

46-2997

Convection and deep water formation in the Arctic Ocean-Greenland Sea system.

Rudels, B., et al, *Journal of marine systems*, Aug. 1991, 2(3-4), p.435-450, 46 refs.

Quadfasel, D.

Ocean currents, Convection, Sea water freezing, Oceanography, Hydrography, Stratification, Heat loss, Water temperature, Flow rate.

46-2998

Evolution of the upper water layer in the marginal ice zone, austral spring 1988, Scotia-Weddell Sea.

Veth, C., *Journal of marine systems*, Aug. 1991, 2(3-4), p.451-464, 25 refs.

Sea ice distribution, Ice water interface, Ice melting, Hydrography, Water temperature, Surface temperature, Biomass, Oceanography, Wind factors, Antarctica—Weddell Sea.

In this paper, a one-dimensional turbulent erosion model is presented to study the temporal behavior of the upper layers of the water column in the marginal ice zone during ice retreat. Input parameters in the model are the regular meteorological observations on board, global radiation and ice cover estimates. The model results are validated by comparison with *CTD* profiles measured during repeated sections through the marginal ice zone of the Weddell-Scotia Sea sector of the southern ocean over a six week-period in the austral spring, 1988. (Auth. mod.)

46-2999

Simple ice-ocean coupled model for ice drift in marginal ice zones.

Tang, C.L., et al, *Journal of marine systems*, Aug. 1991, 2(3-4), p.465-475, 27 refs.

Fissel, D.B.

Sea ice, Ice water interface, Turbulent boundary layer, Drift, Ocean currents, Ice cover effect, Wind factors, Mathematical models, Velocity.

46-3000

Plankton distribution and the impact of copepod grazing on primary production in Fram Strait, Greenland Sea.

Hirche, H.J., et al, *Journal of marine systems*, Aug. 1991, 2(3-4), p.477-494, 41 refs.

Baumann, M.E.M., Kattner, G., Gradinger, R.

Marine biology, Plankton, Biomass, Ice cover effect, Sea ice, Ice edge, *Oceanography, Greenland Sea.*

46-3001

Influence of oceanographic processes on pelagic-benthic coupling in polar regions: a benthic perspective.

Grebmeier, J.M., et al, *Journal of marine systems*, Aug. 1991, 2(3-4), p.495-518, Refs. p.514-518.

Barry, J.P.

Marine biology, Biomass, Nutrient cycle, Ice cover effect, Oceanography, Ocean bottom.

A major difference between the Antarctic and Arctic is that the nearshore deep Antarctic is characterized by relatively high benthic abundance and biomass despite low water column production, suggesting that stability, low disturbance levels and cold temperatures enable benthic organisms to grow larger than in the Arctic. Both physical and biological disturbance levels are high in the marginal seas of the Arctic and may directly influence benthic productivity. The relationship between primary production and sedimentation of organic material to the benthos is nonlinear due to its dependence on the role of the pelagic food web. This review discusses the pelagic system with respect to how it impacts the net food supply reaching the benthos. A major objective is to demonstrate the influence of oceanographic processes on pelagic-benthic coupling in polar regions from a "bottom-up" perspective, using benthic studies from various regions in both the Arctic and Antarctic. Similarities and differences in oceanographic processes, benthic abundance and biomass, and benthic carbon cycling within these polar marine systems are discussed and areas for further research identified. (Auth. mod.)

46-3002

Proceedings of the Fourth Symposium on Antarctic Logistics and Operations, Sao Paulo, Brazil, 16 to 18 July 1990.

Kohnen, H., ed, Brasília, Brazil, Gráfica e Editora Ideal Ltda, [1991], 312p., For individual papers see 46-3003 through 46-3030 or G- 45950 through G-45977.

Teixeira, A.J., ed, Fowler, A.N., ed.

Logistics, Buildings, Maintenance, Transportation, Environmental protection.

The scope of antarctic logistics and operations involves providing the correct materials, supplies and provisions at the correct time and place they are needed in Antarctica. Certainly this means meticulous planning and the proper use of all kinds of highly specialized sea, air and land transportation, including the development of transport technologies appropriate for use in the rigorous antarctic environment. It also means facilities design, construction and maintenance; communications including *the use of space technologies; field operations under extreme* conditions; innovative provisions for health care and safety, and the extraordinary extension of both new and proven methods and technologies for the protection of the environment in Antarctica. In short, antarctic logistics comprise everything that is required to work efficiently when time is of the essence, to be transported to and from, and to survive in safety and reasonable comfort in one of the harshest and most remote areas of the world. In twenty-eight papers and two abstracts, this symposium delves into such logistical aspects of antarctic science as the environment, energy alternatives, communications, satellites, transportation, and architectural psychology.

46-3003

Current developments in environmental protection at Terra Nova Bay Station.

Cervellati, R., et al, Symposium on Antarctic Logistics and *Operations, Fourth, Sao Paulo, Brazil, 1990.* Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.1-14.

Metalli, P., Testa, L.

Waste disposal, Water treatment, Aerosols, Antarctica—Terra Nova Bay.

Environmental safeguard procedures of the Italian Antarctic Program at Terra Nova Bay are reviewed. Members of the expedition are trained and bound to follow a code of conduct. Local waste production is kept to a minimum. Figures are given for the last expeditions. Wastes are sorted according to type, only partly disposed of after *treatment in the Antarctic* Treaty Area by means of an incinerator and a water treatment plant, and mostly returned to Italy. The Station environmental impact is evaluated by monitoring the airborne particulate (tables on elemental composition are given) and the effluents of the above plants. (Auth.)

46-3004

New Zealand antarctic research programme waste management procedures.

Geddes, D., Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.15-24.

Waste disposal, Sewage disposal, Education.

The main elements of the waste management procedures are the separation of waste into three categories—burnable, non-burnable, and hazardous—and the subsequent disposal of each category of waste. Burnable waste is burnt in a high-temperature, double-burning incinerator at Scott Base, while all other dry waste is returned to New Zealand by either aircraft or ship for disposal. Where possible, material which is suitable for recycling (e.g. aluminum cans) is handled separately. With only minor exceptions, waste generated in field camps is returned to Scott Base for disposal through the above system. (Auth.)

46-3005

Environmental management of Australia's antarctic program.

Sayers, J.C.A., Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.26-40.

Waste disposal, Environmental protection, Legislation, Education.

Operational guidelines and environmental impact assessment procedures have been developed to implement and supplement existing Australian environmental legislation, Antarctic Treaty Recommendations and obligations under other international agreements. Management plans for stations are being developed. Environmental awareness is encouraged and developed in expeditioners, starting at the recruitment stage. The expeditioner induction program involves progressively more detailed instruction on environmental management. A more intensive training program on environmental responsibilities is given to Station Leaders, Station Environment Officers and Inspectors appointed under Australian Antarctic environment protection legislation. Vessels under charter are required to comply with strict requirements for the handling and disposal of shipboard wastes. Waste management plans for stations require the segregation of materials for either local incineration in high temperature incinerators or retrograding to Australia. All waste tips were closed in 1985 and a program of returning waste materials, to the maximum practicable extent, and rehabilitating the landscape is underway. The Australian Antarctic Division is also paying particular attention to improving procedures for the transport, handling and storage of fuels. (Auth.)

46-3006

Recycling and optimized utilization of materials at antarctic research stations.

Stephan, B., Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.41-51, 3 refs.

Waste disposal, Sewage treatment, Fuels, Engines, Sludges.

The lecture summarizes the consumption and treatment of materials and the waste production by antarctic research stations and presents feasible techniques to reduce, reuse, recycle and treat the unneeded materials. Stress is put on proposals to improve the operation of essential technical components of an antarctic research station as power generation stations, water supply and waste water treatment systems under the aspects of recycling and minimization of local pollution. Problems of the treatment of solid and chemical wastes under the conditions in Antarctica are discussed. (Auth.)

46-3007

Fuel spill clean-up in the Antarctic.

Wilkniss, P.E., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.52-65.

Chiang, E.

Fuels, Pollution, Ice shelves, Ice sheets.

In this paper experiences with several fuel spills and the lessons learned during attempts to clean up their aftermaths are described. To illustrate the unique aspects of response and clean-up, examples of spills are selected that occurred in three distinct antarctic environments—marine, coastal; ice shelf, coastal; and antarctic ice sheet, polar plateau. All of these accidents have been publicized and described in television, radio, newspapers, scientific articles, and other publications. This paper focuses on the "inside story"—namely, the experiences from the viewpoint of national antarctic program management and related aspects. (Auth.)

46-3008

Technology limited to the measures for environmental protection in Adélie Land.

Engler, M., Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.66-71.

Cold weather construction, Waste disposal, Aircraft landing areas, Environmental impact, Antarctica—Adélie Coast.

As part of the French engineering program in Adelie Land, all possible measures are being taken to protect the natural environment. These measures involve compensatory actions to ease the habitat disruption for creatures which have established colonies in the area where an airstrip is being built. They also provide for undertaking technological studies to find better ways to dispose of the various kinds of waste products which accumulate from the nature of the environment itself and its isolation. To compensate for bird colony disturbance, zones have been set aside as artificial nesting sites for Adélie penguins, snow petrels, and cape pigeons, and access routes for emperor penguins have been laid out. A proposal has also been made to build a base at Dome C where new principles of waste management will provide for recycling of waste water, global treatment of waste materials, and improved ventilation. (Auth. mod.)

46-3009

Vertical axis wind turbine with integrated magnetic generator.

Heidelberg, G., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.72-82, 2 refs.

Wind power generation, Electric equipment, Antarctica—Georg von Neumayer Station.

Favorable annual wind conditions at the Neumayer winter station suggest the use of wind turbines as alternative energy resources. This is to reduce the fuel consumption and consequently the emission of the station. A smaller amount of fuel being stored would simultaneously minimize the potential hazards of fuel spills. As a first step towards this goal, a prototype of a Vertical Wind Turbine (VAWT) with a maximum power output of 20 KW has been developed as a joint project between the Alfred-Wegener-Institute, Germanischer Lloyd, Hochschule Bremerhaven and Heidelberg Motor. The rigid rotor consists of three straight steel rotor blades; the diameter of the rotor is 10 m with a swept area of 56 sq m. The rotor is mounted on a telescopic tower. The permanent magnetic ring of the running field generator is integrated into the support structure of the tower, while the stator is mounted to the tower. A pitch control and yawing system are not required. The whole system has only one rotating part. The wind turbine, which was tested in 1990 on a special test site on the German North Sea coast, is scheduled to be integrated into the diesel electrical system of Neumayer Station in 1991 for further testing. (Auth. mod.)

46-3010

New designed wind generator for Antarctica.

Ishizawa, K., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.83-95.

Kimura, S., Takanaga, T.

Wind power generation, Electricity, Antarctica—Asuka Station.

A new wind generator for Antarctica was designed, taking past problems into consideration. Main improvements are as fol-

lows: (1) fixed pitch and fixed yaw control; (2) permanent magnet exciter for the AC generator; and (3) a monopole type tower for minimal snow drift to the leeward. The output power will be about 1 kW at 20 m/s of wind speed. The generator is planned to be installed and operated at Asuka Station in 1991. (Auth.)

46-3011

Potential for renewable energy sources in the Antarctic.

Sheinstein, A.S., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.96-105, 13 refs.

Shpil'rain, E.E.

Wind power generation, Solar radiation, Electricity.

The potential for use of solar and wind energy systems in the Antarctic was analyzed. Based on a specially designed procedure, annual solar radiation intake on inclined solar collectors was obtained and their optimal orientation was defined. Advantages of the use of solar heating systems are shown. Economical performances of solar and wind power systems are given. The potential for low temperature sources is discussed. (Auth.)

46-3012

Project and management criteria and scientific support to integrated communication system of Italian Antarctic Research Program.

Blasi, L., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.106-117.

De Simone, M., Testa, M.

Radio communication, Equipment, Antarctica - Terra Nova Bay.

The project criteria of the integrated communication systems of the Italian Antarctic Research Program are presented. These systems include different kinds of installations so that transmissions can be carried out on HF, VHF, UHF and satellite bands. Also presented are the integration problems of various systems and the completions made according to different needs due to the extreme environmental and climatic operation conditions. Particular care has been devoted to solving engineering problems due to the installation of large dimension antennas. Also described is the future development of lines of telecommunication activity with particular attention to digital transmission in HF and satellite bands. Research activities which support the communication systems in Italy and in Antarctica are discussed, with emphasis on propagation and research on the physics of the ionosphere. (Autl mod.)

46-3013

SARSAT beacon use in Antarctica.

Dougherty, T., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.118-126.

Nitschke, R.

Rescue operations, Spacecraft, Radio communication.

The United States Antarctic Program (USAP) began equipping selected remote scientific field parties with Search and Rescue Satellite (SARSAT) beacons during the 1989-90 austral summer season. These beacons offer a tremendous potential for mobile remote teams to transmit their precise location and an emergency notification to their home base without use of VHF, UHF or HF communications. This capability is particularly valuable as a means to increase the safety net for scientific investigators during the coming years of increasing solar flare activity with its negative impact on HF propagation. Two years of investigation, research and trials, with lessons learned along the way, led to the decision to acquire the beacons and deploy them in the field. There have been some growing pains. More is being learned about their use and about a number of problem areas, including hazardous cargo designation, closing the communication loop back to the home station, and necessary international coordination for testing. (Auth. mod.)

46-3014

Multipurpose satellite data receiving system constructed at Syowa Station.

Ejiri, M., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.127-134.

Takeuchi, S., Sato, N.

Radio communication, Radomes, Electronic equipment, Antarctica--Showa Station.

A Multipurpose Satellite Data Receiving (MSDR) system with a large dish antenna of 11 m in diameter was built at Showa Station. In the austral summer 1988, the foundation for the antenna structure was constructed, together with a building of 120 sq m and a cable duct of about 80 m. In 1989 the system was completed with the installation of the parabolic antenna and radome (17 m in diameter) on the foundation. It has been operating by receiving and processing S-and X-band data from satellites since Feb. 1989. This system also has the capability to receive a signal from radio sources and can be used as a very long baseline interferometer to determine the precise position of Showa Station. The antenna system was designed to satisfy these conditions: the radome can stand a blizzard of a maximum wind speed of 60 m/s; the antenna structures including azimuth and elevation drive mechanisms can operate at an air temperature of -45 C. All structures are divided into pieces which can be transported by the icebreaker Shirase and easily reassembled. (Auth.)

46-3015

Scientific goals and technical design for the combined German ERS-VLBI antarctic ground station.

Nottarp, K., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.135-142.

Reiniger, K.D.

Electronic equipment, Remote sensing, Data processing, Spacecraft, Antarctica - Bernardo O'Higgins Station.

The Federal Republic of Germany will install during the antarctic summer 1990/91 a combined system for ERS satellite data reception and VLBI measurements at the Chilean antarctic base Bernardo O'Higgins in a cooperative project. The paper describes scientific goals and the chosen technical design for this complex installation. (Auth.)

46-3016

Air cushion vehicle transport in Antarctica: from concept to reality.

Winter, B.W., Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.144-160, 10 refs.

Air cushion vehicles.

The paper considers the design criteria that went into selecting an air cushion vehicle and its delivery at McMurdo Station. The arrival of the air cushion vehicle was only the beginning; an evaluation and operational plan to use this unique vehicle had to be developed. A summary of the operational statistics and review of some of the missions accomplished by the vehicle are made in conjunction with a slide presentation of actual missions in the McMurdo area. The travel capability in regards to surface conditions encountered is also discussed. A review of modifications made to the existing vehicle and changes recommended for future air cushion vehicles procured for antarctic research to expand its operational capabilities are included in the presentation. The conclusion shows that the air cushion vehicle is a means by which science researchers and logistical support can have increased mobility over the antarctic terrain. This is accomplished with improved safety for its users at little or no operating cost increase. (Auth.)

46-3017

Antarctic fields.

Mellor, M., MP 3032, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.162-173, 7 refs.

Runways, Snow strength, Bearing strength, Surface roughness.

Following a summary of recent U.S. air activities in Antarctica, aircraft runways are considered. Various airfield options from open-field landings to conventional paved runways are dealt with, the relevant factors being given in tables that cover (a) construction and maintenance and b) operations. Bearing capacity, rutting resistance, surface roughness and runway dimensions are discussed. It is concluded that a system of hard-surface runways for conventional aircraft is technically feasible. (Auth.)

46-3018

Improvement of methods for construction of high-strength aerodromes in Antarctica.

Kliuchnikov, G.IA., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.174-180.

Klopov, V.P., Aver'ianov, V.G., Petrov, V.N.

Runways, Aircraft landing areas, Snow (construction material), Snow strength.

The example of the structure of snow and snow/ice surfaces created for the first time at the Molodezhnaya AMC for IL-18D aircraft with take-off mass of 64 t is shown. The structure consists of the following layers: a protective layer of fresh snow with any strength; surface made of strengthened firn and snow; artificial foundation made of firn and snow; artificial foundation made of strengthened firn; and natural foundation of firn with proven strength. The strength of layers decreases from the upper layer downwards in accordance with the regularities of reduction of stresses with the change of snow/firn cover depth. Stresses were determined by equipment consisting of membrane gauges and different amplifiers of electric signals. The total thickness of strengthened snow layers was 70 cm and was equal to the active depth of aircraft wheel impact. (Auth. mod.)

46-3019

Development, design and construction of an antarctic research and supply vessel.

Jones, D., Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.181-190.

Ships, Icebreakers.

The British Antarctic Survey needed to replace the 1956-built *John Biscoe* in order to meet expanding needs for the relief of the five antarctic stations and to enhance its limited marine research capability. A dual-role vessel with improved ice capability and enhanced cargo-carrying capacity, including the ability to transport aviation turbine fuel in bulk was sought. To address the research objectives, a representative group of users of the existing UK research vessel fleet was asked to define a scientific specification covering current requirements and anticipated developments in marine science through the expected life span of the vessel. The most significant and ultimately most expensive aspect of the resultant specification was the demand for limitation of underwater radiated noise during research cruises. The vessel is being constructed with large working deck and laboratory areas, sophisticated and comprehensive data acquisition and processing facilities, and largely single-berth scientific accommodation. (Auth. mod.)

46-3020

Design of an ocean-research and logistics support vessel for the Italian scientific base in Antarctica.

Orlandini, F., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.191-205.

Cordano, A.

Ships, Logistics, Oceanographic ships.

The development of the Italian scientific base and relevant research activities require the exploitation of a specially designed vessel. The ship's design was defined taking into account experience gained in previous expeditions, development programs of the Italian base in Antarctica, and research activities to be carried out. Consequently, the vessel's design criteria were developed and defined on the basis of the mission profile. (Auth.)

46-3021

R/V *Aranda* on the Weddell Sea in season 1989-90.

Mälkki, P., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.206-219.

Niemistö, L., Aro, E.

Logistics, Ships, Research projects, Instruments.

The FINNARP-89 expedition consisted of two sections: research carried out at Aboa research station and the marine research program based on a new research vessel. The marine research program was carried out on the Weddell Sea in the 1989-90 season. There were seven marine research programs. In all about 80% of the programs and samplings planned were carried out. The new research vessel especially tailored to marine research was a compromise between a large and a small vessel in many respects. During the expedition, however, shortcuts, restrictions and limitation in equipment and instruments were observed. The total time period for the expedition was 150 days and for execution of scientific programs, 56 days. It was observed that too many scientific programs were included; the time table was too tight and some of the projects ran out of time. Future expeditions like this should not be divided in two parts so cooperation between various projects could be made more effective. The projects in operation could also be more flexible. Some parts of the communication system were not satisfactory and should be reviewed.

46-3022

On development of a preventive maintenance program for McMurdo Station, Antarctica.

Martin, A.G., Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.220-233.

Buildings, Equipment, Vehicles, Maintenance, Logistics.

This presentation covers the development of a preventive maintenance program at McMurdo Station. The presentation outlines the objectives of a preventive maintenance program and provides an overview of the department for which the preventive maintenance program was developed. The presentation then provides a brief chronological sequence of events that took place during the development process. Next it reviews the six computer modules that are the nucleus of the preventive maintenance program. The presentation concludes by identifying some of the benefits the preventive maintenance program has provided, offers several practical suggestions, and identifies problems to be aware of. (Auth.)

46-3023

***Design guidelines of antarctic buildings for wind loads* and snow drifting.**

Kim, D.H., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.234-245, 13 refs.

Kwok, K.C.S., Rohde, H.F.

Cold weather construction, Buildings, Wind (meteorology), Snowdrifts.

This paper describes a wind tunnel study to evaluate the wind-induced loads and snowdrift formation around a number of different shapes of elevated buildings for antarctic use. A 1:50 scale boundary layer wind model was generated in a closed-circuit boundary layer wind tunnel at Sydney University, Australia. A force balance was used to measure the aerodynamic

forces on the elevated models. Coefficients of mean drag, lift, and standard deviations of drag and lift are presented. Snow-drifting simulations were performed by using sodium bicarbonate as a snow model. A Moire fringe camera, image-grabbing system and contour analyzing software were used to analyze the data. The result showed that elevated antarctic buildings are recommended to have chamfered or radiused corners. The chamfer or radius should be as large as practicable, given the restriction on the internal layout of the building. It was also evident that the buildings should be raised above ground to avoid the attachment of snowdrifts against the building at the leeward side. (Auth.)

46-3024
Settlement and deformation of buildings at Asuka Station.
Ishizawa, K., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.246-256.
Hannuki, T., Sano, M., Kusunoki, K.
Buildings, Snowdrifts, Settlement (structural), Antarctica—Asuka Station.
The buildings at Asuka Station were erected on the ice sheet between Dec. 1984 and Feb. 1987. Those buildings for living quarters, power plant, observation hut, workshop and passages are now almost buried in the snow. Measurements on the movement and settlement of buildings in relation to ice sheet flow and snow accumulation have been carried out every year since 1985. Horizontal northward movement of the living quarters was about 1.0 m/a. Settlement of buildings was noticeable in the first year, but decreased gradually. Uneven settlement within a hut was observed, being due to the difference in the snow accumulation on the windward and leeward sides of the hut; snow drift on the lee side sometimes reached 5 m above the undisturbed surface. (Auth.)

46-3025
Description and design criteria of the Italian base in Antarctica: A.I.M., automatic integrated module.
Lori, A., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.257-271.
Voli, D., Zucchelli, M.
Equipment, Electric power, Antarctica—Terra Nova Bay.
Italian scientific teams have been working now in Antarctica for six years. The summer base has grown during these years and all building plans are practically finished. Design criteria and development plans have been strongly affected by the extreme environmental conditions. During the summer there is little time available for operations. This has not only heavily influenced the development of the buildings, but also limited the duration of scientific activities. Even those activities which do not require personnel, such as the recording of environmental data, have been discontinued when all personnel leave Antarctica for the winter. The Antarctic Project has decided, after requests from the Italian scientific community, to develop an automatic system capable of generating electrical energy for nine months of the year to permit the collection of data and its transmission to Italy. (Auth.)

46-3026
FINNARP 88 construction activities.
Nordlund. O.P., Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.272-277.
Cold weather construction, Buildings, Traverses, Antarctica—Aboa Station.
The Finnish Antarctic Station Aboa comprises one half of the Nordenskiöld base located at the mountain base (about 73S, 13W), the other half being the Swedish station Wasa. The stations were built during the austral summer of 1988-89 to serve the national research programs of both countries independently. The design principles and the equipment for the station are described. The construction work on the site was completed in just 30 days by a structural engineer, an electronics engineer, a mechanical technician, and a medical doctor. The transportation effort to haul 7 living containers, 4 ISO containers, a communication tower, a steel arch garage tent, fuel, food and equipment for two coming seasons (a total of more than 100 metric tons) 150 km inland in close collaboration with the Swedes, is described. The heat and electricity generation at the station and satellite communication and radio equipment are discussed. (Auth. mod.)

46-3027
Autonomous antarctic observing station.
Tüg, H., Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.278-286, 7 refs.
Monitors, Telemetering equipment, Electronic equipment, Data transmission.
This paper describes the development of an automatic unattended platform for multi-purpose applications in polar regions. The platform consists of a 10' measuring container and two symmetrically mounted fuel tanks in 10' standard frames. The main unit contains the complete power generation, air temperature regulation, a central micro-VAX computer and additional electronic racks. Five kilowatts of electrical power (220 V AC, 50 Hz) are available for about one year of continuous operation. In late 1990 the station will be placed close to the German Georg von Neumayer base to collect meteorological, oceanographic and glaciological data. These data are stored internally but also telemetered via the polar orbiting bidirectional satellite TUBSAT to Bremerhaven. (Auth.)

46-3028
Influence of architectural theory on the design of Australian antarctic stations.
Incoll, P.G., Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.287-303, 19 refs.
Cold weather construction, Buildings.
Habitability theories of architectural design are used as the basis of a thesis which states that the correct architectural design of a building can create a positive effect on the morale of its occupants. This effect is of more value to buildings in Antarctica than in any other place on Earth. Applications of these theories to the design of Australia's antarctic buildings in the 1980s are described, and a project to assess their effect on the morale of the occupants is suggested. (Auth.)

46-3029
New concepts for Antarctica.
Bardin, V.I., et al, Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.305-307, 2 refs.
Sheinstein, A.S.
Cold weather construction, Research projects, International cooperation.
New research programs and design concepts for Antarctica were suggested at the Soviet-American seminar for Architecture in Extreme Environments, which was held in Moscow in Apr. 1990. This paper discusses Antarctic Planetary Testbed (USA) and Design of the Antarctic Polar Station Based on Energy Saving Options (USSR) concepts.

46-3030
Pilot solar water heater testing in Antarctica.
Sheinstein, A.S., Symposium on Antarctic Logistics and Operations, Fourth, Sao Paulo, Brazil, 1990. Proceedings, edited by H. Kohnen, A.J. Teixeira, and A.N. Fowler, Brasília, Brazil, Gráfica e Editora Ideal, Ltda, [1991], p.308-312, 1 ref.
Heating, Solar radiation, Water supply.
A solar water heater has been designed for harsh environments. The results of testing a pilot water heater at Molodezhnaya Station are discussed. The results indicate that in Antarctica a flat plate solar collector could be used for water heating to temperature levels of 50-60 C. It was shown that in polar regions an inclined collector discretely moving to track the sun would receive higher solar radiation than fixed collectors. (Auth. mod.)

46-3031
Dynamic ice structure interaction; theory and applications.
Eranti, E., *Finland. Technical Research Centre (Valtion teknillinen tutkimuskeskus). VTT publications*, 1992, No.90, 82p., Ph.D. thesis to be presented at the Helsinki University of Technology. 62 refs.
Ice loads, Ice solid interface Ice pressure, Offshore structures, Ice cover strength, Ice deformation, Dynamic loads, Analysis (mathematics).

46-3032
Microearthquakes as indicators of ice stream basal conditions.
Anandakrishnan, S., Madison, University of Wisconsin, 1990, 137p., University Microfilms order No.-DA9106667, Ph.D. thesis. 66 refs.
Ice sheets, Glacier flow, Basal sliding, Icequakes, Glacier beds, Earthquakes, Seismic velocity, Mathematical models, Antarctica—West Antarctica.
During the 85-86 and the 88-89 antarctic field seasons, an earthquake detection array was deployed at Upstream B and Upstream C camps on ice streams B and C, respectively. A possible explanation is presented for the difference between ice streams B and C, West Antarctica. Ice stream B is moving at a velocity of 450 m/yr yet neighboring ice stream C is moving at less than 10 m/yr. It has been suggested that the high velocity of ice stream B is due to a thin dilatant bed beneath the ice stream that shears and deforms readily, thus allowing the rapid motion. It is hypothesized that this dilatant layer once existed beneath ice stream C; currently, however, it is of lower porosity and greater strength than the equivalent layer beneath ice stream B. Thus ice stream C cannot deform its bed and move rapidly. Rather, the driving stress of the ice produces shear fracture and faulting within the thin till layer beneath the ice. A seismograph array was built specifically to record the high-frequency microearthquakes at Upstream B and Upstream C camps. The microearthquakes recorded by this array were located and the source fault-plane was determined. The spectra of the arrivals were used to determine the source parameters. Analysis of microearthquake records indicates that 1-25% of the motion of ice stream C is due to slip on faults at the base of the ice stream. By contrast, only 1 part in 10,000,000 of the motion of ice stream B is due to slip on faults. (Auth.)

46-3033
Full-scale testing and data analysis of the shaftline and nozzle dynamics in ice on the M.V. *Ikaluk*. Final report.
Cowper, D.N.B., et al, *Transport Canada. Publication*, May 1990, TP 10402E, 179p., With French summary. 43 refs.
Ritch, R., Comfort, G., Murray, A.
Icebreakers, Ice breaking, Ice navigation, Ice loads, Tests, Propellers, Performance.

46-3034
Effect of length of freezing period on durability of concrete.
Stark, D., *Portland Cement Association. Research and development bulletin*, 1989, RD096.01T, 9p., With French, Spanish, and German summaries. 3 refs.
Concrete freezing, Concrete durability, Freeze thaw tests, Ice accretion, Air entrainment.

46-3035
Ice load measurements on board the MS *Kemira*, winter 1990.
Muhonen, A., *Helsinki University of Technology. Laboratory of Naval Architecture and Marine Engineering. Report*, 1991, M-109, 116p., PB92-127380, 6 refs.
Ice navigation, Ice loads, Tanker ships, Ice pressure, Ice conditions, Metal ice friction, Finland.

46-3036
Yukon Territory snow survey bulletin and water supply forecast, April 1, 1992.
Canada. Indian and Northern Affairs. Water Resources Division, Whitehorse, 1992. 27p.
Snow surveys, Snow water equivalent, Runoff forecasting, Canada—Yukon Territory.

46-3037
Determining the intrinsic permeability of frazil ice. Part 1. Laboratory investigations.
White, K.D., *U.S. Army Cold Regions and Engineering Laboratory. Report*, Dec. 1991, CR 91-23, 15p., ADA-248 325, 17 refs.
Frazil ice, Permeability, River ice, Ice mechanics, Laboratory techniques.
The intrinsic permeability of frazil ice describes the capacity for flow through the ice matrix and can be used to estimate the porosity of the deposit. There are no existing in- situ tests for determining the intrinsic permeability of a frazil ice deposit. The borehole dilution test, an in-situ, relatively nondestructive test often used in soils testing, was modified for use in frazil ice. In this test the dilution of a dye tracer introduced into a borehole made in a laboratory frazil ice deposit was measured over time. The test results were used to find the seepage velocity through the frazil deposit, from which the intrinsic permeability is calculated using the Dupuit-Forchheimer approximation to flow between two reservoirs. The results from the laboratory experiments indicate that the test may be modified for use as an in-situ method to determine intrinsic permeability in frazil ice deposits.

46-3038
Joint United States-Canadian obscuration analysis for smokes in snow (JUSCAN OASIS): smoke week XI data report.
Perron, F.E., Jr., ed, *U.S. Army Cold Regions and Engineering Laboratory. Special report*, Jan. 1992, SR 92-01, 106p., ADB-162 747, 2 refs.
Hardenberg, M.J., ed.
Military operation, Military equipment, Cold weather operation, Snowfall, Snow surface temperature, Snow physics, Snow cover effect, Statistical analysis.
The Smoke Week XI field trials were conducted jointly by the United States and Canadian governments at the Defense Research Establishment Valcartier (DREV), Quebec, Canada, during Feb.-Mar. 1989. The Project Manager, Smoke/Obscurants (PM Smoke), and the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) were the U.S. sponsoring organizations, while other government agencies and contractors cooperated. The objectives of the field study were to 1) determine the effects of cold weather and falling snow on electro-optical and laser weapon systems with and without obscurants, 2) study the synergistic effects of snow and the dissemination of smoke and obscurants, 3) extend to cold and snow conditions the search, detection and acquisition study objectives of Smoke Week X conducted at Fort Huachuca, AZ, during Sep.-Oct. 1988, 4) assess under cold climatic conditions the field performance of inventory and developmental visual and infrared screening materials, and 5) acquire data on the effects of smokes and obscurants on target contrasts in snow environments. This data report presents information gathered at Smoke Week XI by CRREL personnel, including field data collected on meteorology, snow characterization and atmospheric propagation.

46-3039
Notes for cold weather military operations.
Richmond, P.W., ed, *U.S. Army Cold Regions and Engineering Laboratory. Special report*, Dec. 1991, SR 91-30, 58p., ADB-162 421, 32 refs.
Military operation, Logistics, Water supply, Cold weather survival, Cold weather operation, Snow (construction material).
The effect of cold weather on personnel and equipment must be considered during planning and preparing for military operations. A large amount of information and a number of special techniques have been developed at CRREL for conducting operations in the cold. Much of this information has been incorporated into Army doctrine as doctrinal publications have been updated or rewritten. The purpose of this report is to provide a fairly comprehensive compilation of cold weather operational procedures and techniques and to consolidate, in one place, *recent achievements that are not published in a doctrinal* source. This report is divided into two parts. Part 1 contains current U.S. Army operational doctrine; excerpts of cold weather doctrine are presented for operations that are particularly sensitive to cold regions effects. Part 2 is a compilation of knowledge from other sources, particularly from research programs conducted by the CRREL, to provide further information on special techniques and methodologies for conducting military operations in the cold. The following broad areas are discussed: planning, mobility, countermobility, survivability, decontamination, water supply and communications.

46-3040
Engineering geocryology: a reference manual. [Inzhenernaia geokriologiia: spravochnoe posobie],
Ershov, E.D., ed, Moscow, Nedra, 1991, 439p., In Russian. 40 refs.
Engineering geology, Geocryology, Economic development, Environmental protection, Frozen rocks, Permafrost thermal properties, Ground ice, Permafrost beneath structures.

46-3041
Analysis of extensive contamination of snow cover by metals in proximity to sources of industrial waste. [Analiz prostranstvennogo zagriazneniia snezhnogo pokrova metallami vblizi istochnikov promyshlennykh vybrosov],
Sataeva, L.V., et al, *Moscow. Institut eksperimental'noĭ meteorologii. Trudy*, 1990, Vol.17(145), p.22-28, In Russian. 4 refs.
Mel'chakov, IU.L., Malakhov, S.G.
Snow impurities, Snow cover, Environmental impact, Metals.

46-3042
Analysis of avalanche incidence along the Biysk-Turochak-Artybash highway. [Analiz lavinoobrazovaniia vdol' avtodorogi g. Biĭsk- s.Turochak-s.Artybash],
Chubenko, A.G., et al, *Zapadno-sibirskiĭ regional'nyĭ nauchno- issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1991, Vol.97, p.71-80, In Russian. 4 refs.
Nochevalov, IU.V.
Avalanche formation, Avalanche forecasting, Avalanche mechanics, Snow accumulation.

46-3043
Problems in avalanche research. [Problemy issledovaniia snezhnykh lavin],
Fomin, A.G., *Zapadno-sibirskiĭ regional'nyĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1991, Vol.97, p.80-84, In Russian.
Avalanche mechanics, Avalanche forecasting.

46-3044
***Question of determining thermal-energy resources of* climatic processes in cryolithozone conditions.** [K voprosu ob opredelenii teploenergeticheskikh resursov klimaticheskikh protsessov v usloviiakh kriolitozony],
Karnatsevich, I.V., *Zapadno-sibirskiĭ regional'nyĭ nauchno- issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1991, Vol.97, p.89-97, In Russian. 22 refs.
Radiation balance, Climate, Heat balance, Air temperature, Analysis (mathematics).

46-3045
Studying the maximum capacity of the liquid phase in melting snow and slush ice when calculating its strength. [K otsenke predel'nogo soderzhaniia zhidkoĭ fazy v taiushchem snezhnom i shugovom l'du pri raschete ego prochnosti],
Ergin, V.P., *Zapadno-sibirskiĭ regional'nyĭ nauchno-issledovatel'skiĭ gidrometeorologicheskiĭ institut. Trudy*, 1991, Vol.97, p.97-104, In Russian. 5 refs.
Liquid phases, Snow melting, Slush.

46-3046
150 years since G.G. Hällström's studies on ice break-up dates as climatic indicators.
Kajander, J.M., Conference on climate and water, Helsinki, Sep. 11-15, 1989. Vol.1, Helsinki, 1989, p.329-337, 18 refs.
Ice breakup, Climatic changes, History, River ice, Freezeup.

46-3047
Winter ice 1989/90 along the German coast between the Ems and Trave rivers. [Der Eiswinter 1989/90 im deutschen Küstengebiet zwischen Ems und Trave],
Koslowski, G., *Deutsche hydrographische Zeitschrift*, 1990, 43(2), p.89-90, In German. 4 refs.
Ice conditions, Sea ice, Air temperature, Atmospheric pressure, Germany.

46-3048
Winter ice 1988/89 along the German coast between the Ems and Trave rivers. [Der Eiswinter 1988/89 im deutschen Küstengebiet zwischen Ems und Trave],
Koslowski, G., *Deutsche hydrographische Zeitschrift*, 1989, 42(1), p.17-19, In German. 3 refs.
Ice conditions, Sea ice, Air temperature, Atmospheric pressure, Germany.

46-3049
Hydrographic investigations of Kangerdlugssuaq (West Greenland) as part of the International Greenland Expedition EGIG 1959. [Die hydrographische Untersuchung des Kangerdlugssuaq (Westgrönland) im Rahmen der Internationalen Grönlandexpedition EGIG 1959],
Lüthje, H., *Deutsche hydrographische Zeitschrift*, 1989, 42(2), p.81-101, In German with English and French summaries. 13 refs.
Ocean currents, Oceanographic surveys, Icebergs, Calving, Water temperature, Salinity, Drift, Greenland.

46-3050
Katabatic wind on melting snow and ice surfaces (II); application of a theoretical model.
Ohata, T., *Meteorological Society of Japan. Journal*, Feb. 1989, 67(1), p.113-122, With Japanese summary. 17 refs.
Glacial meteorology, Ice air interface, Wind (meteorology), Snow air interface, Heat flux, Mathematical models.

46-3051
Katabatic wind on melting snow and ice surfaces (I); stationary glacier wind on a large maritime glacier.
Ohata, T., *Meteorological Society of Japan. Journal*, Feb. 1989, 67(1), p.99-112, With Japanese summary. 32 refs.
Glacial meteorology, Ice air interface, Wind (meteorology), Mountain glaciers, Snow air interface, Ice melting, Snow melting.

46-3052
Lagoons in cold climates and their performance in Saskatchewan.
Mathavan, G.N., et al, Western Canada Water and Sewage Conference, 1989. Proceedings, 1989, p.51-66, 30 refs.
Viraraghavan, T.
Sewage treatment, Microbiology, Water treatment, Ponds, Water chemistry, Ice cover effect, Cold weather performance.

46-3053
Impacts on river discharge of changes in glacierized components of mountain basins.
Johnson, P.G., et al, *Water pollution research journal of Canada*, 1987, 22(4), p.518-529, 20 refs.
David, C.
Meltwater, Glacial rivers, Subglacial drainage, Mountain glaciers, Alpine glaciation, Runoff forecasting.

46-3054
***Non-stationary creep behavior of floating ice beams* under lateral loads.**
Hui, D., et al, *International journal of solids and structures*, 1987, 23(11), p.1485-1503, 56 refs.
Xirouchakis, P.C., Chen, Y.H.
Ice creep, Ice cover strength, Ice loads, Analysis (mathematics).

46-3055
Density of columnar-grained ice made in a laboratory.
Nakawo, M., *National Research Council, Canada. Building research note*, 1980, No.168, 8p., 15 refs.
Artificial ice, Ice density, Ice growth, Ice structure.

46-3056
Electric potential of a rubbed ice surface.
Takahashi, T., *Journal of the atmospheric sciences*, Nov. 1969, Vol.26, p.1259-1265, 11 refs.
Ice electrical properties, Ice crystal collision, Electric potential, Ice friction, Ice surface.

46-3057
How cold can it get.
Phillips, D., *Canadian geographic*, Dec. 1991, 111(6), p.8-9.
Records (extremes), Air temperature, Canada.

46-3058
U.S. Army Corps of Engineers reaps many GIS rewards.
Bruzewicz, A.J., *GIS world*, Mar. 1992, MP 3033, p.44-50.
Research projects, Data processing, Remote sensing, Mapping, Environmental impact, Computer programs.

46-3059
Systematic consideration of the environment in the development of smart weapons systems.
Link, L.E., Jr., et al, *Military engineer*, Aug. 1991, MP 3034, p.14-15.
West, H.W.
Infrared photography, Detection, Military research.

46-3060
Operation of materiel at extremely low temperatures.
Diemand, D., *Military engineer*, Aug. 1991, MP 3035, p.24-25, 4 refs.
Cold weather performance, Military equipment, Engine starters, Lubricants, Fuels.

46-3061
Infrared roof warranty inspection.
Korhonen, C.J., *Military engineer*, Aug. 1991, MP 3036, p.32-33, 4 refs.
Roofs, Moisture detection, Infrared photography.

46-3062
Progress in the improvement of HDS performance.
Marsh, C., et al, *Military engineer*, Aug. 1991, MP 3037, p.34-35.
Segan, E.G., Phetteplace, G.E.
Heating, Heat transmission, Military facilities, Water pipelines.

46-3063
Remote sensing of the Alaskan and Persian Gulf oil spill.
Link, L.E., Jr., et al, *Military engineer*, Aug. 1991, MP 3038, p.52-53.
McKim, H.
Oil spills, Remote sensing, Spaceborne photography, Data processing.

46-3064
Discussion of "The effect of latex gloves and nylon cord on ground water sample quality".
Parker, L.V., *Ground water monitoring review*, Fall 1991, MP 3039, 2p., 13 refs. Original article by J.L. Canova and M.G. Muthig appeared in Ground water monitoring review, Spring 1991, Vol.11, No.3, p.98.
Soil pollution, Ground water.

46-3065
Performance of ground-coupled heat pumps in military family housing units.
Phetteplace, G.E., et al, MP 3040, Solar engineering, New York, American Society of Mechanical Engineers, 1992, p.377-383, 6 refs.
Ueda, H., Carbee, D.
Heat recovery, Cooling systems, Heat sinks, Heat sources, Military facilities, Residential buildings.
As part of a program to demonstrate appropriate technologies for saving energy in military facilities, 10 ground-coupled, water-to-air heat pump systems have been installed at Ft. Polk, LA. The systems were installed in housing units that are three-bedroom, two-story residences with four residences per building. Each heat pump system is coupled to two closed-loop vertical exchangers of 61-m (200-ft) depth. Five of the systems have desuperheater domestic hot water heat recovery units. The performance of each of the 10 heat pump systems is being closely monitored. In the heating mode both units with desuperheaters and units without achieved COPs (coefficients of performance) averaging 3.5. In the cooling mode, the average COP of units equipped with desuperheaters was 3.0, while those without desuperheaters achieved an average COP of 2.5.

46-3066
Development of field screening methods for TNT, 2,4-DNT and RDX in soil.
Jenkins, T.F., et al, *Talanta*, 1992, 39(4), MP 3041, p.419-428, 27 refs.
Walsh, M.E.
Soil pollution, Soil chemistry, Explosives, Chemical analysis, Detection.
Simple field-screening methods are presented for detecting 2,4,6-TNT, 2,4-DNT and RDX in soil. A 20-g portion of soil is extracted by manually shaking with 100 ml of acetone for three minutes. After the soil settles, the supernatant is filtered and divided into three aliquots. Two aliquots are reacted with potassium hydroxide and sodium sulfite to form the red-colored Janowsky complex when 2,4,6-TNT is present or the blue-purple complex when 2,4-DNT is present. The third aliquot of the extract is passed through a strong anion exchange resin to remove nitrate and nitrite. Then the extract is acidified and RDX is reduced with zinc to nitrous acid, which is reacted with a Griess reagent to produce a highly colored azo dye. Concen-

trations of TNT, 2,4-DNT and RDX are estimated from their absorbances at 540, 570 and 507 nm, respectively. Detection limits are about 1 microgram/g for 2,4,6-TNT and RDX and about 2 micrograms/g for 2,4-DNT. *Concentration estimates from field analyses correlate well with laboratory analyses.*

46-3067

Experimental study of electromagnetic wave propagation in dense random media.

Koh, G., *Waves in random media*, 1992, Vol.2, MP 3042, p.39-48, 12 refs.

Wave propagation, Radar echoes, Electromagnetic properties, Scattering.

Controlled experiments have been conducted to measure the propagation of synthetically generated pulses in dense random media. The dense media were prepared by embedding spherical dielectric scatterers in a homogeneous background medium, the size and volume fraction of the scatterers were the controlled parameters. A network analyzer-based system operating in the frequency domain was used to measure the electric field reflected and transmitted by slab-shaped samples of dense media as the source signal was swept from 26.5 to 40 GHz. An inverse Fourier transform was used to convert the frequency domain response into time domain pulse waveforms. The time domain response was then used to obtain pulse propagation velocity and attenuation in the controlled samples. The experimental results are shown to be in general agreement with dense medium theories.

46-3068

Effective dielectric constant of a medium with spherical inclusions.

Koh, G., *IEEE transactions on geoscience and remote sensing*, Jan. 1992, 30(1), MP 3043, p.184-186, 8 refs.

Dielectric properties, Wave propagation, Radar echoes, Microwaves.

The Maxwell-Garnett theory is frequently used to predict the effective, or the average, dielectric constant of a mixture composed of spherical inclusions embedded in a host medium. The effective medium theory assumes that the volume fraction occupied by the spherical inclusions is small and that the size of the inclusions is small compared to the wavelength. Experiments using controlled samples have shown that the Maxwell-Garnett theory is applicable up to an inclusion volume fraction of 0.2. At higher volume fractions, the effective dielectric constant appears to be dependent on the inclusion sizes.

46-3069

Performance assessment of four environmental analytical contract laboratories.

McGee, I.E., et al, *American environmental laboratory*, Feb. 1992, 4(1), MP 3044, p.11-19, 3 refs.

Grant, C.L., Jenkins, T.F., Stutz, M.H.

Chemical analysis, Soil chemistry, Soil pollution, Laboratories, Environmental impact.

46-3070

Specification-based modified control limits in quality control of trace chemical analyses.

Grant, C.L., et al, *Association of Official Analytical Chemists International. AOAC International journal*, 1992, 75(1), MP 3045, p.39-45, 11 refs.

McGee, I.E., Jenkins, T.F., Stutz, M.H.

Chemical analysis, Statistical analysis, Laboratory techniques.

Shewhart X and R charts were used to maintain and validate data quality of percent recovery estimates for 8 analytes determined by 4 procedures used routinely in 4 commercial laboratories over a 2-year period. However, because range (R) estimates of uncertainty did not include lot-to-lot calibration variability, approximately 24% of the lots were "out-of-control." The authors pooled standard deviations for S(O) (repeatability within lot), S(L) (calibration variability), and S(R) (reproducibility), which represents the total variability. Values of S(O) and S(L) were generally similar in size although there were some substantial differences between analytes and between laboratories for a given analyte. When control limits were based on reproducibility rather than repeatability, only about 6% of the lots were "out-of-control." However, these limits are less convenient to compute at the bench, within-lot precision estimates are still required, and there is still no information on data acceptability. Capability estimates from the grand mean +/-3 S(R) were surprisingly consistent for the 8 analytes. These values coupled with data quality objectives suggested the 82-115% range as the specifications for acceptable individual recoveries. A combination of repeatability limits plus modified limits anchored to specifications retains the simplicity of range computations while offering substantial administrative advantages. Examples are given to illustrate these points.

46-3071

Apparent donor-acceptor interaction between nitroaromatics and acetonitrile.

Leggett, D.C., et al, *Journal of solution chemistry*, 1992, 21(1), MP 3046, p.105-108, 11 refs.

Miyares, P.H., Jenkins, T.F.

Hydrogen bonds, Solutions, Chemical properties, Explosives, Water chemistry, Hydrocarbons.

The partitioning behavior of nitro-aromatics in octanol-water and acetonitrile/NaCl-saturated water was examined. The nitro group contribution is opposite in the two systems, from which two different bonding mechanisms were inferred. In addition to cavity effects the octanol-water system is characterized by H-bonding of water to the nitro groups, while in the acetonitrile/-NaCl-saturated water system electron donor-acceptor complexation predominates. A linear free-energy relationship which relates the partition coefficients in the two systems was logP-(aw) = 0.727 logP(ow) + 0.395 n + 0.742, where n is the number of nitro groups per ring.

46-3072

Coupled vertical and horizontal galloping.

Jones, K.F., *Journal of engineering mechanics*, Jan. 1992, 118(1), MP 3047, p.92-107, 26 refs.

Power line icing, Ice loads, Wind pressure, Vibration, Analysis (mathematics).

Galloping can occur when wind blows on ice-coated conductors. In this paper, the linearized coupled vertical-horizontal galloping equations are derived and the eigenvalues defining the motion are determined analytically. The intrinsic coupling between the vertical and horizontal equations requires that there be no vertical motion if the horizontal motion is constrained. Furthermore, vertical galloping may be initiated by a horizontal displacement or velocity. The solution of the eigenvalue equation indicates that the coupled galloping criterion may be either more or less stringent than Den Hartog's criterion. The galloping trajectory is either a straight line at a small angle to the vertical, or under more extreme conditions, defines an elliptical envelope. Solutions are obtained for four cases chosen from the literature to illustrate the effect of different combinations of values of the aerodynamic parameters.

46-3073

Passive microwave remote and *in situ* measurements of arctic and subarctic snow covers in Alaska.

Hall, D.K., et al, *Remote sensing of environment*, 1991, Vol.38, MP 3048, p.161-172, 46 refs.

Sturm, M., Chacho, E.F., Jr.

Snow surveys, Snow cover distribution, Snow depth, Snow stratigraphy, Snow density, Snow temperature, Microwaves, Radiometry, United States, Alaska.

Between 11 and 19 Mar. 1988, airborne and satellite passive microwave measurements were acquired simultaneously with ground measurements of depth, density and stratigraphy of the snow in central and northern Alaska. Five aircraft flights were flown along a north-south transect between about 147N and 152W, and extending from about 63N (south of Fairbanks, AK) to the Arctic Ocean coastline, with an Aircraft Multichannel Microwave Radiometer (AMMR) on-board operating at 92, 37, 21, and 18 GHz. Passive microwave data from the satellite-borne Special Sensor Microwave Imager (SSMI), operating at 85.5, 37, 21, 18, and 10 GHz, were obtained concurrently. A good correspondence in brightness temperature (TB) trends between the aircraft and satellite data was found. However, an expected inverse correlation between depth hoar thickness and TB was not found to be strong. A persistent TB minimum in both the aircraft and the satellite data was detected along the northern foothills of the Brooks Range. In an area located at about 69N, 149W, the TB as recorded from the aircraft microwave sensor dropped by 55 K. Satellite microwave measurements showed a TB decrease of up to 45 K at approximately the same location. Snow pit measurements did not reveal notable differences in snow characteristics or depth in this location. An examination of passive microwave satellite data from 1978 to 1987 revealed that similar low late-winter TB values were found in approximately the same locations as those observed in Mar. 1988. According to the satellite data, the zone of low TB develops as the snow deepens, and reaches the lowest values in Mar. or Apr. each year. The cause of this TB minimum is unknown, but thought to be related to snow stratigraphy. The observed difficulty in relating the ground measurements to data collected using aircraft and satellite passive microwave sensors is attributed to the fact that the snow depth and character are highly variable in central and northern Alaska. This variability is exemplified in the field measurements as well as in the passive microwave measurements.

46-3074

Dynamics of infrared and millimeter-wave environments issues for scene simulation.

Davis, R.E., et al, MP 3049, Ground Target Modeling and Validation Conference, 2nd. Proceedings, Houghton, Michigan Technological University, Aug. 1991, 15p., 18 refs.

Boyne, H.S., Nagle, J.A., Link, L.E., Jr.

Radar echoes, Snow cover effect, Environment simulation, Infrared reconnaissance, Snow thermal properties, Temperature measurement, Surface temperature, Backscattering.

The U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) is conducting research to understand and predict the interaction of electromagnetic radiation with cold regions environments. The CRREL efforts are a component of the U.S. Army Corps of Engineers Scene Dynamics Program which is designed to measure the environmental conditions during seeker/sensor field tests, to identify mechanisms by which the environment affects performance, and to develop a sufficient characterization of the environment to model the electromagnetic background response. The environmental effects can then be assessed quantitatively and incorporated into the sensor system design. During the winters of 1988, 1990, and 1991, CRREL conducted field tests to monitor background scene dynamics during the Joint Munitions Test and Evaluation Program Office (CHICKEN LITTLE JPO) captive flight tests at Grayling, MI. This paper presents an analysis of the effects of environmental processes on sensor performance based on the 1990 data. The impact of environmental variability on infrared and millimeter-wave systems will be stressed. A decision tree approach is used to classify expected sensor system performance as a function of near-surface meteorological conditions which affect the surface energy exchange. Issues for distributing this approach spatially to mixed background scenes will be discussed.

46-3075

Moving boundary step ice formation in turbulent flow.

Albert, M.R., MP 3050, Numerical methods in thermal problems, Vol.VII, edited by R.W. Lewis, et al, Swansea, Wales, Pineridge Press, 1991, p.101-111, 14 refs.

Turbulent flow, Ice formation, Liquid solid interfaces, Phase transformations, Heat transfer, Boundary value problems, Mathematical models.

For solidification processes involving fluid flow in the melt, the nature of the flow field has a profound influence on the configuration of the solid-liquid interface, especially when the flow is turbulent. In order to investigate solidification problems in turbulent flow a numerical moving boundary method is presented for arbitrary geometries in two dimensions. It is the first moving mesh method to include the solution of the turbulent flow field as part of the calculations. The importance of including detailed calculations in the flow field is illustrated in an application involving ice formation in turbulent flow between parallel plates. The application illustrated here represents the first theoretical prediction of irregular ice profiles resulting from freezing of flow in a uniform duct with uniform boundary conditions.

46-3076

Anticipating environmentally related changes in the detection capability of exterior intrusion detection systems.

Peck, L., MP 3051, Northbrook, IL, Institute of Nuclear Material Management, 1991, p.546-550, 4 refs. Presented at the 32nd annual meeting, New Orleans, July 2-31, 1991.

Detection, Warning systems, Site accessibility, Cold weather tests.

Changes in detection capability due to winter and transitional environments have been determined for several exterior intrusion detection systems (IDS) by means of controlled intrusions and long-term monitoring of IDS performance. These changes have been evaluated in terms of environmental effects on the phenomenology by which each IDS detects an intruder. This paper summarizes the dependence of detection capability on operating environment. It identifies the site conditions (weather, snow cover, frozen/thawed state of the ground) that should be monitored in order to anticipate when and what changes in detection capability are occurring. Guided by an awareness of IDS performance as a function of the environment, security personnel may avoid vulnerabilities in detection capability by adjusting IDS sensitivity to maintain the required probability of detection without incurring unacceptable nuisance alarm rates.

46-3077

Relaxation of the second moments in rapid shear flows of smooth disks.

Louge, M.Y., et al, MP 3052, U.S./Japan Conference on the Micro-Mechanics of Granular Materials, 4th, Potsdam, NY, Aug. 4-7, 1991. Proceedings, 1991, 9p., 2 refs.

Jenkins, J.T., Hopkins, M.A.

Shear flow, Avalanche modeling, Mathematical models.

This paper compares the results of numerical simulations for two-dimensional, rapid, homogeneous shear flows of identical smooth inelastic disks with the predictions of Jenkins and Richman for the relaxation of the second moments of the velocity distribution function following a homogeneous but anisotropic disturbance of their steady values. For nearly elastic disks, the time-history of the relaxation is in excellent agreement with the theory in both its dense and dilute limits. However, deviations are observed in the case of inelastic particles.

46-3078

On the structure of 3D shear flows.

Hopkins, M.A., et al, MP 3053, U.S./Japan Conference on the Micro-Mechanics of Granular Materials, 4th, Potsdam, NY, Aug. 4-7, 1991. Proceedings, 1991, 9p., 11 refs.

Jenkins, J.T., Louge, M.Y.

Shear flow, Avalanche modeling, Statistical analysis.

This paper describes an investigation of structure in moderately dilute three-dimensional shear flows. Structure is defined as a dynamic inhomogeneity or fluctuation in the spatial concentration field. Numerical experiments are performed with large numbers of identical frictionless, inelastic spheres. The spheres are contained in a fully periodic cubic control volume. A state of shear is maintained in the control volume by moving the upper periodic image in one direction and the lower image in the opposite direction. As the coefficient of restitution of the spheres is lowered, conditions in the control volume deviate from a state of simple shear, exhibiting strong wavelike fluctuations in the concentration, stress, and velocity fields. Visual inspection of the spatial concentration field reveals a strong tendency for spheres with a low coefficient of restitution to form dense clouds. The clouds are, in general, oriented such that they are aligned with the mean velocity and normal to the direction of the mean velocity gradient created by the moving periodic images of the control volume.

46-3079
Spatial variability of CaCO3 solubility in a Chihuahuan desert soil.
Marion, G.M., et al, *Arid soil research and rehabilitation*, 1990, Vol.4, MP 3054, p.181-191, 24 refs.
Schlesinger, W.H., Fonteyn, P.J.
Soil chemistry, Desert soils, Geochemistry, Solubility, Nutrient cycle, Soil profiles, United States—New Mexico.
Spatial variability in CaCO3 solubility is an important factor in parameterizing simulation models and designing experiments. The objective of this study was to quantify the spatial variability, both horizontal and vertical, in CaCO3 solubility in a Chihuahuan Desert soil. CaCO3 solubilities were estimated in 1:5 soil:water suspensions. Soil horizon extracts were generally supersaturated with respect to calcite. The mean (+/-1 SE) *pIAP(CaCO3) for the A, B(k1), and B(k2) horizons were* 8.03 (0.055), 8.19 (0.019), and 8.26 (0.015), respectively. The differences in pIAP between the A and B horizons (vertical variability) were statistically significant; these differences could be due to organic matter inhibition of calcite precipitation. Supersaturation with respect to calcite and vertical variability in CaCO3 solubility needs to be explicitly considered in simulation models. The standard errors in pIAP (horizontal variability) were greatest for the A horizons and decreased with increasing soil depth. Given the inherent variability in CaCO3 solubility, a large sample size is necessary to detect small differences in CaCO3 solubility for this Chihuahuan Desert soil.

46-3080
Stable isotope geochemistry of CaCO3 on the Tanana River floodplain of interior Alaska, U.S.A.: composition and mechanisms of formation.
Marion, G.M., et al, *Chemical geology. Isotope geoscience section*, 1991, Vol.86, MP 3055, p.97-110, 43 refs.
Introne, D.S., Van Cleve, K.
Soil chemistry, Geochemistry, Revegetation, Isotope analysis, Nutrient cycle, Forest soils, Floodplains, Plant ecology, Evapotranspiration, United States--Alaska—Tanana River.
On the river floodplains of interior Alaska, forests exist on *calcareous, alluvial soils. The objectives of this study were to* determine the stable C-13 and O-18 isotopic composition of CaCO3 along a plant primary successional sequence (250 yr.) and to examine possible mechanisms controlling the formation of CaCO3 in these floodplain soils. Soil samples were analyzed from duplicate plots of three successional stages: open shrub (Stage III, 4 yr. old), young balsam poplar-alder (Stage V, 30 yr. old), and mature white spruce (Stage VIII, 170-250 yr. old). The early stages of plant succession showed little variation in the mean soil delta C-13 PDB (-4.3 to -4.0 per mill), while the Stage VIII sites showed the greatest carbon depletion (delta C-*13 PDB*=-7.9 to -6.2 per mill). *The mean soil delta O-18 PDB* values ranged from -16.3 to -14.6 per mill. These low delta O-18 values reflect, in part, the very depleted meteoric precipitation (delta O-18 PDB=-50.3 per mill) for this cold continental site. A few surface "salt crust" samples showed significant enrichment in both C and O isotopes. Six calcite-bearing rock samples from the Alaska Range, the source of the alluvial parent *material, fell into two classes with means for* delta C-13 PDB of -0.2 and -5.2 per mill and means for delta O-18 PDB of -14.6 and -18.7 per mill, respectively. The early Stage III profiles showed little variation in isotopic composition with soil depth, suggesting that the CaCO3 was primarily inherited with the alluvial material and was not formed in situ. Surface evaporation of water played a minor role and transpirational loss of water played a major role in altering the isotopic composition of soil CaCO3 along the successional sequence. There was no evidence to support freezing as a mechanism controlling soil CaCO3 precipitation. Over the 170-250 yr-old plant successional sequence, the biotic factor significantly altered the isotopic composition of soil CaCO3.

46-3081
Pilot-scale study of alum sludge dewatering in a freezing bed.
Martel, C.J., et al, *American Water Works Association. Journal*, Dec. 1991, 83(12), MP 3056, p.51-55, 13 refs.
Diener, C.J.
Sludges, Artificial freezing, Sewage treatment, Water treatment, Freeze thaw cycles.
The purpose of this study was to demonstrate the capability of a sludge-freezing bed for dewatering alum sludge. Alum sludge containing average total solids of 0.5% was applied to the pilot-scale bed and frozen in layers 2-10 cm thick over the winter of 1989-90. By the end of the winter, 99 cm of sludge had been frozen. After thawing and draining of meltwater, the depth of sludge remaining in the bed was reduced to 3-5 cm, a 96% reduction in volume. The remaining solids had a granular consistency similar to medium-sized sand. The meltwater drained through the granular solids as easily as through the underlying sand. Column tests show that these granular solids could accumulate in the bed for several years before removal would be necessary.

46-3082
Long-term changes in soil and plant metal concentrations in an acidic dredge disposal site receiving sewage sludge.
Palazzo, A.J., et al, *Water, air, and soil pollution*, 1991, Vol.57/58, MP 3057, p.839-848, 28 refs.
Reynolds, C.M.
Sewage disposal, Sludges, Soil chemistry, Plant physiology, Plant tissues, Revegetation, Waste disposal, Land reclamation.
A long-term experiment was conducted to determine the distribution of sludge-borne metals applied to a revegetated acidic dredge spoil disposal site. The initial soil was infertile and highly acidic (pH 2.4). Sewage sludge and lime were applied in 1974 at the rates of 100 and 23 metric tons/ha, respectively, and tilled into the soil to a depth of 20 cm. In 1974 an adjacent site was also revegetated *with topsoil and lime but without* sludge. Soil and plants were sampled 2, 4 and 16 yr following seeding. After 16 yr the total and DTPA-extractable Cu, Zn, Cr, Pb, Ni and Cd decreased in soils to nearly the levels of the control soils. Concentrations of metals in plants also decreased. Decreases in tissue concentrations ranged from 40 to 70% for Cu, Cr, Pb, Ni and Cd and up to 90% for Zn. The results showed that a single 100 metric tons/ha application of sewage sludge containing high concentrations of metals was a cost-effective method for improving plant growing conditions on highly acidic soils.

46-3083
Can long-path FTIR spectroscopy yield gas flux measurements through a variance technique.
Andreas, E.L., et al, *Atmospheric environment*, 1992, 26A(2), MP 3058, p.225-233, 44 refs.
Gosz, J.R., Dahm, C.N.
Atmospheric composition, Infrared spectroscopy, Turbulent exchange, Gases, Boundary layer, Vapor transfer, Statistical analysis.
Long-path Fourier transform infrared (FTIR) spectroscopy is capable of measuring concentrations of many environmentally important trace gases in the atmospheric surface layer over horizontal averaging paths of up to 1 km. If the FTIR could also measure the variance in gas concentrations, one could conceivably use it to estimate the path-averaged vertical flux of any gas that the FTIR can detect. The problem in measuring variances, however, is that the large sampling volume—which allows the FTIR to measure concentrations with the best resolution—degrades its response to the high-wavenumber turbulent fluctuations that contribute to the variance. In this paper, the authors use a model for the three-dimensional scalar spectrum to look at the effects of this volume averaging on the FTIR's ability to measure gas concentration variance. The modeling suggests that there is no realistic configuration or sampling rate that will let the FTIR measure gas concentration variance in the surface layer. Its sampling volume must simply be so large that all turbulent fluctuations with wavenumbers from the dissipation region down to the vicinity of the spectral peak are irrevocably degraded. Analysis identifies experiments that can test these predictions. Despite the FTIR's predicted inability to measure gas fluxes through the variance technique, it is shown that it can still yield these fluxes through other micrometeorological techniques.

46-3084
Freezing out sludge.
Martel, C.J., *Civil engineering*, Nov. 1991, 61(11), MP 3059, p.64-65.
Sludges, Water treatment, Sewage treatment, Artificial freezing.

46-3085
Isotope effects in the equilibrium and non-equilibrium vaporization of tritiated water and ice.
Baumgärtner, F., et al, *International journal of radiation applications and instrumentation. Part A. Applied radiation and isotopes*, 1990, 41(4), p.395-399, 15 refs.
Kim, M.A.
Heavy water, Freeze drying, Sublimation, Water chemistry, Water structure, Phase transformations, Isotopes, Isotopic labeling.

46-3086
Cold acclimation in plants.
Alberdi, M., et al, *Phytochemistry*, 1991, 30(10), p.3177-3184, 216 refs.
Corcuera, L.J.
Acclimatization, Plant physiology, Cold tolerance, Frost resistance, Plant tissues, Biogeography, Cold weather survival.

46-3087
Preliminary results of glacier studies from digital radar data.
Schoonmaker, J.W., Jr., et al, ASPRS/ACSM annual *convention, Baltimore, MD, Apr 2-7, 1989. Technical* papers, Vol.3, Falls Church, VA American Society for Photogrammetry and Remote Sensing, American *Congress on Surveying and Mapping*, 1989, 9p., 3 refs.
Jones, J.E., Molnia, B.F.
Glacier surveys, Glacier surfaces, Radar photography, Side looking radar, Crevasse detection, Aerial surveys, Data processing.

46-3088
Foresight in snow planning.
Tunnock, G., *American Public Works Association. APWA reporter*, Sep. 1991, 58(9), p.14-15,20.
Snow disposal, Urban planning, Canada—Ontario—Ottawa.

46-3089
Planning increases efficiency of snow, ice operations.
Jonas, D.L., *American Public Works Association APWA reporter*, Sep. 1991, 58(9), p.16-17.
Road maintenance, Weather forecasting, Snow removal, Ice control.

46-3090
Combatting ice dams and sliding snow on roofs.
Tobiasson, W., *American Public Works Association APWA reporter*, Sep. 1991, 58(9), MP 3060, p.18-19.
Roofs, Ice control.

46-3091
Analysis and modeling of the river ice breakup and jamming process and its effect on flooding.
Guo, Q.Z., Minneapolis, University of Minnesota, 1991, 158p., University Microfilms International order No.DA9205445, Ph.D. thesis. 86 refs.
River ice, Ice breakup, Ice jams, Flood forecasting, Mathematical models.

46-3092
Diamictites of late Pliocene age in western Iceland.
Geirsdóttir, Á., *Jökull*, 1990, No.40, p.3-25, With Icelandic summary. 54 refs.
*Glacial deposits, Stratigraphy, Paleoclimatology, Geo*chronology, Magma, Geological surveys, Glaciation, Volcanoes, Iceland.

46-3093
Late Weichselian and early Holocene deglaciation history of Iceland.
Norddahl, H., *Jökull*, 1990, No.40, p.27-50, With Icelandic summary. 78 refs.
Glaciation, Moraines, Sea level, Marine deposits, Geochronology, Ice sheets, Glacier oscillation, Paleoclimatology, Iceland.

46-3094
Early Holocene deglaciation in central Iceland.
Kaldal, I., et al, *Jökull*, 1990, No.40, p.51-66, With Icelandic summary. 46 refs.
Víkingsson, S.
Glaciation, Glacial deposits, Glacial geology, Glacier oscillation, Ice sheets, Paleoclimatology, Geochronology, Iceland.

46-3095
Studies in the vegetational history of north Iceland. A radiocarbon-dated pollen diagram for Flateyjardalur.
Hallsdóttir, M., *Jökull*, 1990, No.40, p.67-81, With Icelandic summary. 57 refs.
Paleoclimatology, Palynology, Paleobotany, Vegetation patterns, Radioactive age determination, Iceland.

46-3096
Late glacial history of Iceland. Comparison with isotopic data from Greenland and Europe, and deep sea sediments.
Sveinbjörnsdóttir, Á.E., et al, *Jökull*, 1990, No.40, p.83-96, With Icelandic summary. 42 refs.
Johnsen, S.J.
Paleoclimatology, Glacial deposits, Marine deposits, Isotope analysis, Glacier oscillation, Iceland.

46-3097
Chemistry of precipitation on the Vatnajökull glacier and chemical fractionation caused by the partial melting snow.
Gíslason, S.R., *Jökull*, 1990, No.40, p.97-117, With Icelandic summary. 22 refs.
Snow composition, Snow impurities, Snowmelt, Glacial hydrology, Glacier ice, Snow ice interface, Air pollution, Water chemistry, Analysis (mathematics), Iceland.

46-3098
Groundwater from glacial areas in Iceland.
Sigurdsson, F., *Jökull*, 1990, No.40, p.119-146, With Icelandic summary. 42 refs.
Glacial hydrology, Subglacial drainage, Ground water, Water chemistry, Seepage, Iceland.

46-3099
Volcanoes beneath Vatnajökull, Iceland: evidence from radio echo-sounding, earthquakes and jökulhlaups.
Björnsson, H., et al, *Jökull*, 1990, No.40, p.147-168, With Icelandic summary. 57 refs.
Einarsson, P.
Volcanoes, Subglacial observations, Subglacial caves, Bottom topography, Earthquakes, Floods, Iceland.

46-3100
Glacier variations 1930-1960, 1960-1980, 1980-1988 and 1988-1989. [Jöklabreytingar 1930-1960, 1960-1980, 1980-1988 og 1988-1989],
Sigurdsson, O., *Jökull*, 1990, No.40, p.169-174, In Icelandic with English summary.
Glacier surveys, Glacier oscillation, Iceland.

46-3101
Snow-meteorological yearbook of the Veneto Region mountains, 1990. [Annale nivometeorologico della montagna Veneta, anno 1990],
Cagnati, A., ed, Arabba, Italy, Regione del Veneto, Dipartimento Foreste, Centro Sperimentale Valanghe e Difesa Idrogeologica, 1991, 245p., In Italian.
Snow surveys, Snow depth, Snow temperature, Weather stations, Air temperature, Humidity, Wind (meteorology), Solar radiation, Italy.

46-3102
Unsteady-state diffusion model of cryoprecipitate formation.
Kukharenko, V.N., et al, *Journal of engineering physics*, Sep. 1991(Pub. Mar. 92), 61(3), p.1134-1138, Translated from Inzhenerno-fizicheskiĭ zhurnal. 12 refs.
Kolgatin, A.G.
Mathematical models, Ice density, Ice crystals, Thermodynamics, Mass transfer, Ice vapor interface, Heat transfer coefficient, Thermal conductivity, Vapor diffusion.

46-3103
Simple construction of strong magnets reinforced by ice and woven glass cloths for long high pulsed field.
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Sasaki, S., Ochimizu, H., Miura, N.
Electric fields, Electric equipment, Ice (construction material), Electrical insulation, Magnetic properties, Electric charge.

46-3104
Effect on signal-to-noise ratio of clipping arctic acoustic data after prefiltering.
Zakarauskas, P., et al, *Acoustical Society of America. Journal*, Feb. 1992, 91(2), p.1164-1167, 5 refs.
Hamm, C.A., Thorleifson, J.M.
Underwater acoustics, Subglacial observations, Ice cracks, Data processing, Acoustic measurement, Sound waves, Filters, Detection.

46-3105
Gas transfer measurements on an ice-covered river.
Macdonald, G., et al, International Symposium on Gas Transfer at Water Surfaces, 2nd, Minneapolis, MN, Sep. 11-14, 1990. Selected papers. Air-water mass transfer. Edited by S.C. Wilhelms and J.S. Gulliver, New York, American Society of Civil Engineers, 1991, p.347-361, 19 refs.
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DLC QC138.I57 1990
Water chemistry, Rivers, Subglacial observations, Aeration, Oxygen, Vapor transfer, Ice cover effect, Measurement, Water pollution, Ice water interface.

46-3106
Snow and avalanches in the Dolomites and Veneto Fore-alps, winter season 1990/91. [Neve e valanghe nelle Dolomiti e Prealpi Venete, stagione invernale 1990/91],
Cagnati, A., et al, Arabba, Italy, Regione del Veneto, Dipartimento Foreste, Centro Sperimentale Valanghe e Difesa Idrogeologica, 1991, 31p., In Italian with English summary.
Luchetta, A., Valt, M.
Snowfall, Avalanches, Snow depth, Snow cover stability, Snowstorms, Italy.

46-3107
Ice thickness data, winter 1990-1991. Ottawa, Environment Canada, Atmospheric Environment Service, Ice Climatology Services, Ice Centre, 1992, 72p., In English and French.
Ice cover thickness, Ice surveys, Snow depth, Freeze-up, Ice breakup, Canada.

46-3108
Investigation of proprietary air-entraining admixtures to produce frost-resistant concrete with low air content.
Neeley, B.D., et al, *U.S. Army Engineer Waterways Experiment Station. Structures Laboratory. Technical report*, Mar. 1992, SL-92-6, 23p. + appends., 7 refs.
McDonald, W.E., Lloyd, M.K.
Concrete freezing, Concrete strength, Air entrainment, Frost resistance, Frost protection, Concrete admixtures.

46-3109
Computer simulations of rapid granular flows interacting with a flat, frictional boundary.
Louge, M.Y., et al, MP 3075, New York, American Society of Civil Engineers, 1991, 6p., 2 refs. Presented at the ASCE conference, Columbus, OH, May 20-22, 1991.
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Rheology, Shear flow, Computerized simulation, Pressure ridges, Fluid mechanics, Boundary value problems.

46-3110
Glaciers of the Alps in the greenhouse of our planet. [Alpengletscher im Treibhaus der Erde],
Haeberli, W., *Regio Basiliensis*, 1991, 32(2), p.59-72, In German with French and English summaries. 43 refs.
Glacier melting, Paleoclimatology, Global warming, Glacier oscillation, Mountain glaciers, Glacier surveys, Alps.

46-3111
Holocene paleoclimatic evidence and sedimentation rates from a core in southwestern Lake Michigan.
Colman, S.M., et al, *Journal of paleolimnology*, 1990, Vol.4, p.269-284, 51 refs.
Jones, G.A., Forester, R.M., Foster, D.S.
Paleoclimatology, Lacustrine deposits, Bottom sediment, Sedimentation, Stratigraphy, Drill core analysis, Isotope analysis, United States—Michigan, Lake.

46-3112
Sludge accumulation in aerated facultative lagoons operating in colder climate.
Narasiah, K.S., et al, *Water science and technology*, 1990, 22(3/4), p.77-82, 6 refs.
Marin, M., Shoiry, J.
Sewage treatment, Sludges, Water treatment, Water chemistry, Microbiology, Decomposition.

46-3113
Operating piezometers under freezing conditions. *U.S. Army Corps of Engineers. Repair, Evaluation, Maintenance, and Rehabilitation Research Program. REMR technical note*, 1990, GT-SE-1.4, 8p., 5 refs. Supplement 3 to Vol.II of the REMR notebook.
Water pipes, Frost protection, Water pressure, Measuring instruments.

46-3114
CAMEO-Valdez: a user's perspective.
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Oil spills, Computer programs, Computer applications, Oil recovery, United States—Alaska—Prince William Sound.

46-3115
Numerical simulation of thermal performance of a salt-gradient solar pond in a cold climate.
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Fukuda, T.
Heat sinks, Solar radiation, Ponds, Heat transfer, Heat recovery, Electric power, Ice water interface, Salt water, Ice cover effect, Mathematical models.

46-3116
Acidification potential of snowpack in Sierra Nevada.
Chen, C.W., et al, *Journal of environmental engineering*, July-Aug. 1991, 117(4), p.472-486, 28 refs.
Gomez, L.E., Lund, L.J.
Snow hydrology, Chemical properties, Snow impurities, Snowmelt, Ion diffusion, Surface waters, Leaching, Snow cover stability, Aerosols, Mathematical models.

46-3117
New polymer coating for reducing ice and snow damages in railways.
Ohishi, F., et al, Pacific Polymer Conference, 1st, Maui, HI, Dec. 12-15, 1989. Proceedings. Progress in Pacific polymer science. Edited by B.C. Anderson and Y. Imanishi, Berlin, Springer-Verlag, 1991, p.327-335, 2 refs.
DLC QD380.P33 1989
Polymers, Railroads, Protective coatings, Ice adhesion, Ice prevention, Cable railways, Mechanical tests.

46-3118
Generation of slanted gas-filled icicles.
Wäscher, T., *Journal of crystal growth*, Apr. 1991, 110(4), p.942-946, 1 ref.
Dendritic ice, Ice growth, Laboratory techniques, Ice structure, Gas inclusions, Bubbles, Ice air interface, Surface structure.

46-3119
Vegetative filter treatment of dairy barnyard runoff in cold regions.
Schellinger, G.R., et al, *Journal of environmental quality*, Jan.-Mar. 1992, 21(1), p.40-45, 24 refs.
Clausen, J.C.
Waste treatment, Soil chemistry, Filters, Water pollution, Runoff, Cold weather performance, Snowmelt, Surface waters, Agriculture.

46-3120
Ablation arc: 3. Time constants of ablation-stabilized arcs in PTFE and ice.
Cao, L.J., et al, *Journal of physics D—applied physics*, Sep. 14, 1991, 24(9), p.1557-1562, 11 refs.
Stokes, A.D.
Electrical insulation, Electrical resistivity, Electrical equipment, Ice electrical properties, Damage, Analysis (mathematics), Radiation balance, Ablation.

46-3121
Effects of freezing on colloidal halloysite: implications for temperate soils.
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Fosberg, M.A.
Soil analysis, Soil freezing, Clay soils, Soil aggregates, Soil colloids, Frost action, Soil formation, Coalescence, Mineralogy, X ray diffraction.

46-3122
Chemistry of dews and frosts in Indianapolis, Indiana.
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Pribush, R.A., Carter, B.H.
Atmospheric physics, Condensation, Ice formation, Hoarfrost, Chemical properties, Scavenging, Air pollution, Ion density (concentration), Aerosols.

46-3123
Hailstones as cloud water composition probes: an initial assessment.
MacGregor, L., et al, *Atmospheric environment*, 1990, 24A(8), p.2247-2251, 18 refs.
Hailstones, Probes, Cloud droplets, Water chemistry, Chemical properties, Sampling, Precipitation (meteorology), Hailstone structure, Cloud physics.

46-3124
Distinction between rain and ice depolarisation by calculation of differential attenuation and phase shift.
Hogers, R.A., et al, *Electronics letters*, Sep. 12, 1991, 27(19), p.1752-1753, 4 refs.
Herben, M.H.A.J., Brussaard, G.
Radio waves, Attenuation, Polarization (waves), Precipitation (meteorology), Data processing, Ice crystal optics, Spacecraft, Telecommunications.

46-3125
Comparison of ultraviolet radiation measured at an arctic and an alpine site.
Ambach, W., et al, *Solar energy*, 1991, 47(2), p.121-126, 25 refs.
Blumthaler, M., Wendler, G.
Ultraviolet radiation, Solar radiation, Photometry, Cloud cover, Albedo, Snow cover effect, Atmospheric density, Radiation absorption.

46-3126
Persistence of trace metals in shallow arctic marine sediments contaminated by drilling effluents.
Snyder-Conn, E., et al, *Oil & chemical pollution*, 1990, 7(3), p.225-247, Refs. p.243-247.
Densmore, D., Moitoret, C., Stroebele, J.
Marine atmospheres, Marine deposits, Water pollution, Drilling fluids, Bottom sediment, Metals, Sampling, Chemical analysis, Ice rafting, Offshore drilling.

46-3127
Unconditionally stable implementation of the isotherm migration method.
Wood, A.S., *Numerical heat transfer—Pt. B*, July-Sep. 1991, 20(1), p.105-113, 18 refs.
Stefan problem, Heat transfer, Isotherms, Phase transformations, Liquid solid interfaces, Analysis (mathematics), Accuracy.

46-3128
Influence of a cubic density law on patterned ground formation.
McKay, G., et al, *Mathematical models and methods in applied sciences*, Mar. 1991, 1(1), p.27-39, 8 refs.
Straughan, B.
Patterned ground, Active layer, Frozen ground mechanics, Soil water migration, Convection, Soil formation, Freeze thaw cycles, Temperature effects, Mathematical models.

46-3129
Model to estimate thermodynamic properties of biological materials during freezing.
Lacey, R.E., et al, *American Society of Agricultural Engineers. Transactions*, July-Aug. 1991, 34(4), p.1836-1841, 32 refs.
Payne, F.A.
Biomass, Forecasting, Solutions, Freezing points, Enthalpy, Thermodynamic properties, Mathematical models, Temperature effects, Latent heat.

46-3130
Mechanical instability in ice I(h). A mechanism for pressure-induced amorphization.
Tse, J.S., *Journal of chemical physics*, Apr. 1, 1992, 96(7), p.5482-5487, 37 refs.
Ice physics, Amorphous ice, Phase transformations, Molecular energy levels, High pressure ice, Temperature effects, Water structure, Vibration, Low temperature research.

46-3131
Proceedings.
International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990, Fairbanks, University of Alaska, Dec. 1991, 778p. (2 vols.), Refs. passim. For selected papers see 46-3132 through 46-3181, 46-3194 through 46-3248, or A-45985, B-46032 through B-46034, E-46038, E-46040, E-46042, F-45981, F-45982, F-45984, F-45989, F-45994, F-45995, F-46035 through F-46037, F-46039, F-46041, I-45983, I-45986 through I-45988, I-45992, I-45993, I-46043 through I-46046, J-45990 and J-45991.
Weller, G., ed, Wilson, C.L., ed, Severin, B.A.B., ed.
Polar atmospheres, Global warming, Atmospheric circulation, Air ice water interaction, Paleoclimatology, Sea ice distribution, Atmospheric composition, Ozone, Ice cover thickness, Glacier oscillation, Permafrost distribution, Permafrost forecasting, Air pollution, Ocean currents, Tundra.
This is a 2-volume collection of abstracts and full length papers (30 of the latter being pertinent to Antarctica— presented at the International Conference on the Role of the Polar Regions in *Global Change, held in Fairbanks, AK, on June 11-15, 1990.* The reports are grouped into 7 sections according to the following areas of interest: detection and monitoring of change; climate variability and climate forcing; ocean-sea ice-atmosphere interactions and processes; effects on biota and biological feedbacks; ice sheet, glacier and permafrost responses and feedbacks; paleoenvironmental studies; and aerosols/trace gases. A summary of recommendations of panel discussions, and photographs, addresses of primary authors, and an author index follow the final section of papers.

46-3132
Variations in sea ice thickness in the polar regions.
Wadhams, P., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.4-13, 37 refs.
Sea ice distribution, Ice cover thickness, Global warming, Polar atmospheres, Air ice water interaction, Antarctica--Weddell Sea.
An overview paper is presented on the evidence for variations in sea ice thickness in the polar regions. Most ice thickness data in the Arctic come from upward-looking sonar profiling by submarines. The available dataset is large. In the Antarctic ice thickness data are much sparser, and most have been obtained by direct drilling. Most of the available winter data come from only two cruises, the 1986 and 1989 Weddell Sea cruises of F.S. *Polarstern*. They show that first-year ice, which comprises most of the ice in the Antarctic, is remarkably thin, with a mean thickness of about 60 cm when undeformed. Second-year ice, found in the western Weddell Sea, is much thicker (1.17 m mean thickness when undeformed). Pressure ridging adds about 42% to the mean drafts due to undeformed ice alone, but most ridges are very shallow (less than 5 m deep). There is no evidence of temporal variations between the two cruises, although winter ice extent in the Atlantic sector was much greater in the second year. (Auth. mod.)

46-3133
Detection of high latitude atmospheric circulation changes using satellite data.
Turner, J., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.14-16, 16 refs.
Polar atmospheres, Global warming, Atmospheric circulation, Remote sensing, Spaceborne photography.

46-3134
Strengths and weaknesses of sea ice as a potential early indicator of climate change.
Parkinson, C.L., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.17-21, 21 refs.
Sea ice distribution, Global warming, Polar atmospheres, Air ice water interaction, Atmospheric circulation.

46-3135
Sea ice variability in the nordic seas.
Vinje, T., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.23-27, 8 refs.
Sea ice distribution, Atmospheric circulation, Polar atmospheres, Air ice water interaction, Global warming.

46-3136
Variations of extent, area, and open water of the polar sea ice covers: 1978-1987.
Gloersen, P., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.28-34, 19 refs.
Campbell, W.J.
Sea ice distribution, Ice edge, Air ice water interaction, Polar atmospheres, Global warming, Remote sensing, Ice surveys.
This paper presents an analysis of SMMR observations of the arctic, antarctic, and global sea ice area, extent, and open water within the ice pack. These data are corrected for instrumental drift and errors due to variations in the ecliptic angle. Also presented is an analysis based on a combination of Fourier and ordinary least-squares regression techniques which yields their interannual variations and trends. The Scanning Multichannel Microwave Radiometer (SMMR), which operated onboard the Nimbus-7 satellite from Oct. 1978 to Aug. 1987, obtained sequential synoptic observations of the entire arctic and antarctic sea ice covers every 2 days through the clouds during night and day. During the time of the study, the antarctic ice cover was trendless both in extent and area. However, the global trend is -1.0 +/- 0.7% at the 95% confidence level. In the Antarctic, the average seasonal range of open water area ranges from a minimum of 1.5 to a maximum of 4.5 million sq km. At the time of maximum ice extent, the amount of open water is typically 25%. The residuals and trends of the open water variations in the ice packs are discussed. (Auth. mod.)

46-3137
Multi-year elevation changes near the west margin of the Greenland ice sheet from satellite radar altimetry.
Lingle, C.S., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.35-42, 33 refs.
Brenner, A.C., Zwally, H.J., DiMarzio, J.P.
Ice sheets, Glacier thickness, Glacier surveys, Glacier oscillation, Spaceborne photography, Global warming, Height finding, Sea level.

46-3138
Radar sensing of polar regions.
Bel'chanskiĭ, G.I., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.47-57, 14 refs.
Pichugin, A.P.
Side looking radar, Ice surveys, Soil surveys, Sea ice distribution, Environmental impact, Pollution.

46-3139
***Polar automatic weather station project* of the University of Wisconsin.**
Stearns, C.R., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.58-62, 1 ref.
Weid G.A.
Weath. ations, Polar atmospheres, Weather observations, Meteorological instruments, Data transmission.
The polar automatic weather station (AWS) of the University of Wisconsin is a battery-powered, solar panel-charged, computer-controlled unit that measures wind speed, wind direction, air temperature, air pressure, vertical temperature difference, and relative humidity. The nominal height of the measurements is three to five m at the time of installation. The data are transmitted to polar-orbiting satellites equipped with the ARGOS data collection system. The sensors are measured at 10-min intervals, and 3-5 values of each sensor are transmitted at 200-sec intervals. More than 100 values at 10-min intervals are recorded in 24 hours. Thirty-four AWS units are installed in Antarctica and 4 AWS units are installed on the Greenland Crest. Up to 28 of the 38 AWS units are received by the Global Telecommunications System at six-hour intervals. (Auth.)

46-3140
Detection of temperature and sea ice extent changes in the Antarctic and southern ocean.
Jacka, T.H., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.63-70, 31 refs.
Budd, W.F.
Sea ice distribution, Air temperature, Global warming, Ice edge, Ice air interface, Polar atmospheres, Ice surveys.
From the increase of atmospheric greenhouse gas concentration to date and the results of transient climate models, an estimate of the expected change in antarctic temperatures and sea ice extent can be made. The existing data for observed changes in temperatures of the Antarctic and southern ocean (extending back to 1956 and 1945, respectively) are analyzed along with the data of sea ice cover (commencing in 1973) to examine the extent to which the anticipated warming trends and sea ice decrease are being realized. In spite of high temporal and spatial variability, the data do support small significant trends of temperature increase and sea ice cover decrease comparable in magnitude to those expected as a consequence of atmospheric greenhouse gas increase. The seasonal cycle shows a delayed period of autumn-winter sea ice growth with a longer period of open water. This supports a mechanism for positive feedback between decreasing sea ice cover and increasing temperatures. (Auth. mod.)

46-3141
Interannual variability of monthly sea ice distributions in the north polar region.
Parkinson, C.L., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.71-78, 7 refs.
Sea ice distribution, Ice surveys, Radiometry, Spaceborne photography, Global warming.

46-3142
Generation of sea ice geophysical flux estimates utilizing a multisensor data processor in preparation for the RADARSAT and EOS eras.
Holt, B., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.80-86, 11 refs.
Kwok, R., Carsey, F., Curlander, J.
Sea ice distribution, Drift, Ice surveys, Synthetic aperture radar, Radar tracking, Data processing, Spaceborne photography.

46-3143
Evaluation of dynamics of polar regions landscapes on the basis of remote sensing information.
Garagulia, L.S., et al, *International Conference on the* Role of the Polar Regions in Glob. Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.90-92, 5 refs.
Ruzhanskiĭ, V.E.
Permafrost forecasting, Permafrost distribution, Remote sensing, Photointerpretation, Permafrost indicators, Thermokarst, Arctic landscapes.

46-3144
Taiga forest stands and SAR: monitoring for subarctic global change.
Way, J.B., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.93-101, 12 refs.
Forest canopy, Phenology, Global change, Synthetic aperture radar, Forest ecosystems, Geobotanical interpretation, Taiga.

46-3145
Contamination of U.S. arctic ecosystems by long-range transport of atmospheric contaminants.
Ford, J., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.102-105, 22 refs.
Landers, D.H.
Air pollution, Polar atmospheres, Atmospheric circulation, Ecosystems, Environmental impact.

46-3146
Data for polar regions research.
Jenne, R.L., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.107-111, 11 refs.
Polar atmospheres, Research projects, Global change, Bibliographies, Data processing.

46-3147
Development of sea ice data sets from passive microwave satellite data: preliminary lessons.
Weaver, R.L., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.120-125, 10 refs.
Troisi, V.J., Hanson, C.S.
Sea ice distribution, Polar atmospheres, Ice surveys, Data processing, Radiometry, Spaceborne photography.

46-3148
Contribution of the Argos system for the study of the polar regions.
Bessis, J.L.H., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.126-132.
Drift stations, Data transmission, Weather stations, Telemetering equipment, Radar tracking, Sea ice, Spacecraft.
The Argos data collection and location system aboard the NOAA polar orbiters has been used by many scientists studying the polar regions. This paper describes the latest improvements, the first worldwide operational location system, and summarizes some applications of the Argos System developed by North American users in the polar regions. Antarctic applications include environmental research for a better understanding of microbial ecosystems; winter data acquisition on ice motion using parachute-dropped buoys; oceanographic drifters to support operational and research programs; automatic weather and geophysical stations; high-altitude balloon experiments to observe supernovas; long-duration balloon experiments to collect data on stratospheric winds; and tracking movements of fur and Weddell seals and penguins. (Auth. mod.)

46-3149
Quick-Look satellite imagery for Alaska: a tool for environmental monitoring.
George, T.H., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.133-140, 8 refs.
Reynolds, G., Dean, K.G., Miller, J.M.
Spaceborne photography, Data transmission, Ice reporting, Weather observations, Synthetic aperture radar, Environmental impact.

46-3150
Measuring sea ice deformation with imaging radar satellites.
Olmsted, C., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.141-146, 14 refs.
Ice deformation, Sea ice distribution, Spaceborne photography, Ice surveys, Synthetic aperture radar.

46-3151
Cloud radiation interaction and the Earth's climate: relevance to the climate of the Arctic.
Stephens, G.L., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.151-157, 13 refs.
Polar atmospheres, Cloud cover, Radiation balance, Cloud physics, Albedo, Solar radiation.

46-3152
Interannual changes in northern hemispheric tropospheric temperature, 1960-1989.
Herbert, G.A., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.159-163, 13 refs.
Air temperature, Polar atmospheres, Atmospheric pressure, Global warming.

46-3153
Interannual variability of the January meridional heat transport by planetary waves in the northern latitudes.
Higuchi, K., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.164-169, 13 refs.
Lin, C.A., Shabbar, A., Knox, J.L.
Polar atmospheres, Atmospheric circulation, Air temperature, Atmospheric pressure, Heat flux, Winter.

46-3154
Low-frequency variability of polar atmosphere due to blocking formations: a numerical experiment of blocking.
Tanaka, H.L., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.170-175, 8 refs.
Polar atmospheres, Atmospheric circulation, Mathematical models, Atmospheric physics, Atmospheric pressure.

46-3155
Trends in global and polar cloudiness from satellite data.
Mokhov, I.I., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.176-183, 23 refs.
Polar atmospheres, Cloud cover, Air temperature, Atmospheric circulation, Spaceborne photography.

46-3156
Cloud radiative effects and associated changes in tropospheric temperatures and winds at the South Pole during austral winter.
Stone, R.S., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.184-189, 20 refs.
Kahl, J.D.
Polar atmospheres, Cloud cover, Atmospheric circulation, Air temperature, Radiation balance, Cloud physics, Climatic changes, Antarctica—Amundsen-Scott Station.
Both the increasing concentrations of greenhouse gases and potential changes in cloud distributions are likely to affect the surface energy budget of the polar regions. Changes in the polar atmosphere are linked to dynamical processes that control the transport of mass, heat, and moisture from lower latitudes, and in turn feed back into the global circulation. An assimilation of radiation and meteorological data collected at Amundsen-Scott Station during the 1986 austral winter is analyzed to gain a better understanding of the relationships between cloud radiative effects, transport processes and the vertical distribution of temperature and wind. Parameters representing the intensity of temperature inversion and the bulk wind shear through the lower troposphere are suggested as appropriate indices for the detection of climate change in the region of the Antarctic Plateau. (Auth. mod.)

46-3157
Plateau weather: a synoptic study of IAGO and ANARE AWS observations in East Antarctica.
Radok, U., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.192-198, 15 refs.
Wendler, G.
Polar atmospheres, Weather stations, Atmospheric circulation, Synoptic meteorology, Air pressure, Air temperature, Wind (meteorology), Antarctica—East Antarctica.
Automatic weather stations (AWS) have been operated for a number of years by U.S. and French scientists cooperating in Project Interactions Atmosphere, Glace, Ocean (IAGO) and by the Australian National Antarctic Research Expeditions (ANARE). Six of these stations are sufficiently close to one another on the East Antarctic Plateau for a synoptic interpretation of their observations. The data for 1987 have been reduced to a common format in order to identify episodes of regionally coherent changes. One of these episodes is described and used to outline steps that will be needed for clarifying the relative importance of the local energy balance and the large-scale circulation for the onset, duration, and cessation of katabatic winds on the plateau. (Auth.)

46-3158
Impacts of projected global warming: a research proposal for the Mackenzie Basin.
Cohen, S.J., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.200-204, 27 refs.
Maxwell, J.B.
Atmospheric circulation, Global warming, Research projects, Polar atmospheres, Environmental impact, Canada—Northwest Territories—Mackenzie River.

46-3159
Problems with the use of climatological data to detect climatic change at high latitudes.
Bowling, S.A., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.206-209, 3 refs.
Weather observations, Climatic changes, Polar atmospheres, Atmospheric circulation, United States—Alaska.

46-3160
Winter season synoptic climatology of Alaska: 1956-1986.
Milkovich, M.F., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.210-219, 21 refs.
Atmospheric circulation, Climate, Synoptic meteorology, Polar atmospheres, Air temperature, Precipitation (meteorology), United States—Alaska.

46-3161
Two-year record of the climate on the Greenland Crest from an automatic weather station.
Weidner, G.A., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.220-222, 4 refs.
Stearns, C.R.
Weather stations, Polar atmospheres, Air temperature, Atmospheric pressure, Heat flux, Wind (meteorology), Greenland.

46-3162
Snow temperature profiles and heat fluxes measured on the Greenland Crest by an automatic weather station.
Stearns, C.R., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.223-226, 4 refs.
Weidner, G.A.
Weather stations, Snow temperature, Snow heat flux, Greenland.

46-3163
Studies of -40 C isothermal layers at high latitudes.
Stewart, R.E., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.227-230, 11 refs.
Lin, C.A.
Polar atmospheres, Atmospheric circulation, Air temperature, Atmospheric physics, Isotherms.
Atmospheric soundings reveal that isothermal layers at temperatures near -40 C sometimes occur at high latitudes. In the absence of sufficient ice nuclei, supercooled water frozen by homogeneous freezing would act to produce such layers. The formation of these layers by homogeneous freezing should furthermore result in significant dynamic responses in the atmosphere. (Auth.)

46-3164
Variations in cloudiness, temperature and satellite-derived outgoing longwave radiation for Alaska.
Wendler, G., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.231-235, 20 refs
Polar atmospheres, Atmospheric circulation, Cloud cover, Infrared radiation, Radiation balance, Air temperature.

46-3165
Surface condition on the antarctic ice sheet.
Seko, K., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.238-242, 17 refs.
Furukawa, T., Watanabe, O.
Glacier surfaces, Ice air interface, Radiometry, Wind factors, Glacial meteorology, Polar atmospheres, Ice sheets, Spaceborne photography.
NOAA AVHRR radar reveals clear images of meso-scale undulating topography, surface properties and katabatic wind field on the antarctic ice sheet. Two typical patterns of undulations on the ice sheet are noted. One of them appears on the slope region where katabatic winds prevail. The band-shaped undulations develop with the prevailing wind, with a spacing of a few tens of km and an amplitude of a few tens of meters. A small percent of albedo change, associated with the variation of accumulation, co-exists with the undulation. The eolian process can be considered a dominant force in making this pattern. Another undulating pattern can be seen further inland on the plateau. This undulation has a different orientation, with an approximate spacing of 50 km and an amplitude of a few tens of meters. (Auth. mod.)

46-3166
Southern ocean: its involvement in global change.
Gordon, A.L., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.249-255, 35 refs.
Ocean currents, Air ice water interaction, Polynyas, Global warming, Upwelling, Water temperature.
Within the seasonal sea ice zone and along the margins of Antarctica, convection injects very cold oxygenated water into the

deep and bottom ocean. These conditions developed as Antarctica shifted into its present configuration and grew a persistent glacial ice sheet, about 14 m.y.a. The potential of the southern ocean to ventilate the deep and bottom ocean layers is related to occurrence of polynyas that form within the winter sea ice cover. Global climate changes would be expected to alter the polynya size and frequency. Under greenhouse-induced warming, offshore polynyas may become less common as the static stability of the southern ocean mixed layer increases. This would diminish the southern ocean's cooling influence on the deep layers of the world ocean, resulting in a warmer deep ocean. The fate of coastal polynyas is less clear. It is likely that they would continue at close to their present form, providing a setting conducive to Antarctic Bottom Water formation. Within the polar front zone, global warming is expected to create lower salinity though slightly cooler surface water. A reduction in the salt input to the Antarctic Intermediate Water would inject it into a shallower horizon at the thermocline base, further limiting the thickness of the thermocline. (Auth. mod.)

46-3167

Model studies of the effects of global warming and antarctic sea ice changes on antarctic and global climates.

Simmonds, I., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.256-262, 18 refs.

Budd, W.F.

Atmospheric circulation, Air ice water interaction, Global warming, Polar atmospheres, Ice cover effect, Sea ice distribution, Models.

Results are discussed obtained in 3 experiments of changing the global ocean temperatures and the concentration and distribution of antarctic sea ice in a General Circulation Model of July climate. The object was to determine the local and global impacts of antarctic sea ice variations alone, as distinct from those coupled with global scale temperature changes which may be associated with global warming. In all cases there were significant changes in the upward flux of sensible heat over the sea ice zone associated with the reductions of sea ice. The response of weaker westerlies between 40 and 65S was common to all 3 experiments. Analyses suggest that a significant proportion of this is a response to the change in sea ice concentration alone. It is suggested that when consideration is given to the possible impact of feedbacks not considered in these experiments, sea ice changes alone, and particularly those in the Southern Hemisphere, have the potential to induce changes on a hemispheric scale. (Auth. mod.)

46-3168

Antarctic sea ice and temperature variations.

Walsh, J.E., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.263-268, 9 refs.

Zwally, H.J., Weatherly, J.W.

Sea ice distribution, Air ice water interaction, Air temperature, Polar atmospheres, Global warming.

Monthly antarctic station temperatures are used in conjunction with grids of sea ice coverage in order to evaluate temporal trends and the strength of associations between the two variables at lags of up to several seasons. The trends of temperature are predominantly positive in winter and summer, but predominantly negative in spring. The spatially aggregated trend of temperature is small but positive, while the corresponding trend of ice coverage is small but negative. Cross-correlations between concurrent anomalies of the two variables are negative over most of the continent and are strongest over the Antarctic Peninsula, especially in winter. In regions other than the Antarctic Peninsula, lag correlations between seasonal anomalies are generally stronger, with ice lagging the summer temperatures and with ice leading the winter temperatures. (Auth.)

46-3169

Role of the southern ocean/sea ice interaction in global climate change.

Martinson, D.G., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.269-274, 18 refs.

Sea ice distribution, Air ice water interaction, Global warming, Polar atmospheres, Ice cover effect.

The seasonal sea ice field of the southern ocean strongly modulates climate through its insulating effect and high albedo. Consequently, it plays a significant role in global climate, and must be adequately parameterized for inclusion in large-scale circulation models attempting to predict the nature of global change. Recent field studies and modeling work show that the ice field is highly sensitive to the static stability and vertical fluxes in the southern ocean water column. Given the marginal stability and strong fluxes of the present-day water column, relatively small changes in the ocean/atmosphere may lead to significant changes in the stability or fluxes and thus the nature of the sea ice cover. These interactions link the local- and regional-scale processes to the global-scale processes, forming a southern ocean/climate feedback loop. The local-scale processes operate at sub-grid scales in most climate models; therefore the results of a local process-oriented model are reviewed to examine the nature of the local-regional interactions which are critical to this system. (Auth. mod.)

46-3170

Antarctic sea ice: its development and basic properties.

Lange, M.A., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.275-283, 20 refs.

Sea ice distribution, Ice cover thickness, Air ice water interaction, Ice growth, Snow ice interface, Ice surveys, Global warming, Antarctica—Weddell Sea.

Investigations on sea ice properties carried out during a number of expeditions into the Weddell Sea are reported. The results provide important baseline data, against which possible changes in the antarctic sea ice cover as induced by climatic changes can be compared. This paper concentrates on results dealing with the textural properties and the ice thickness distributions of antarctic sea ice. The contribution of meteoric ice (snow ice) to the sea ice cover is evaluated by means of deltaO-18 measurements. While changes in extent and thickness are to be expected as a result of possible climatic warming, it is proposed that the amount of snow ice will serve as an additional indicator of such changes. (Auth.)

46-3171

Greenland Sea ice anomalies during 1901-1984 and their relation to an interdecadal arctic climate cycle.

Mysak, L.A., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.284-289, 25 refs.

Manak, D.K., Marsden, R.F.

Sea ice distribution, Atmospheric circulation, Air ice water interaction, Polar atmospheres, Climatic changes, Ice surveys, Greenland Sea.

46-3172

Coupled, zonally averaged atmosphere-ocean model: variability of the thermohaline circulation.

Stocker, T.F., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.291-295, 12 refs.

Wright, D.G., Mysak, L.A.

Ocean currents, Air water interactions, Paleoclimatology, Models, Air temperature, Water temperature, Salinity.

46-3173

Tidal water and ice dynamics in the Arctic Ocean.

Proshutinskiĭ, A.IU., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.296-303, 23 refs.

Tidal currents, Ice water interface, Drift, Ice cover effect, Mathematical models.

46-3174

Laboratory studies of exchange between a polar and a subpolar basin.

Hunkins, K.L., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.304-309, 5 refs.

Ocean currents, Air water interactions, Laboratory techniques, Polar atmospheres, Climatic changes, Water transport.

46-3175

Mathematical modeling in studies of Arctic Ocean circulation.

Doronin, N.IU., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.310-316, 17 refs.

Proshutinskiĭ, A.IU.

Ocean currents, Drift, Air water interactions, Mathematical models.

46-3176

Impact of snow and sea ice variations on global climate change.

Ledley, T.S., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.321-324, 10 refs.

Air ice water interaction, Snow ice interface, Polar atmospheres, Air temperature, Snow air interface, Snow cover effect, Global change, Models.

46-3177

Energy exchange over antarctic sea ice in late winter.

König-Langlo, G., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.325-329, 7 refs.

Ivanov, B., Zachek, A.

Air ice water interaction, Radiation balance, Heat flux, Ice cover effect, Polar atmospheres.

In Sep. and Oct. of 1989, during the "Winter Weddell Gyre Study", energy balance measurements were performed from the Soviet icebreaker *Akademik Fedorov*. The average radiation balance of the sea ice surface turned out to be zero, i.e., shortwave radiation gains were fully compensated by long-wave radiation losses. Due to turbulent fluxes of sensible and latent heat the atmosphere received about 25 W/sq m energy from the ice/ocean system. Since no significant ice melting or freezing was observed, the latter must originate mainly from warm deep water which is entrained into the oceanic mixed layer. (Auth.)

46-3178

Perennial water stratification and the role of basal freshwater flow in the mass balance of the Ward Hunt Ice Shelf, Canadian High Arctic.

Jeffries, M.O., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.332-337, 16 refs.

Ice shelves, Glacier mass balance, Ice cover thickness, Ice bottom surface, Ice water interface, Canada—Northwest Territories—Ellesmere Island.

46-3179

Tracing upper waters in the Arctic Ocean.

Jones, E.P., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.340-346, 19 refs.

Anderson, L.G.

Ocean currents, Air ice water interaction, Polar atmospheres, Marine atmospheres, Global change, Salinity, Sea water, Water chemistry.

46-3180

Arctic Ocean eigen oscillations.

Proshutinskiĭ, A.IU., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.347-354, 12 refs.

Poliakov, I.V.

Ocean currents, Sea level, Tidal currents, Mathematical models, Periodic variations.

46-3181

Determination of net atmospheric heat transfer, ice production, and salt rejection from the Chukchi Polynya using AVHRR thermal imagery.

Groves, J.E., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.1, Fairbanks, University of Alaska, Dec. 1991, p.357-362, 13 refs.

Stringer, W.J.

Polynyas, Air ice water interaction, Ice cover thickness, Infrared photography, Surface temperature, Heat flux, Salinity, Ice growth, Ice volume, Radiometry, Chukchi Sea.

46-3182

Design, construction and testing of a flexible polymer film ice maker.

Leigh, R.W., International District Heating and Cooling Association Annual Conference, 82nd, San Francisco, June 22-26, 1991, Washington, D.C., 1991, p.249-258, 9 refs.

Ice makers, Cooling systems, Heat transfer, Cold storage.

46-3183

Low-temperature chilled water storage and heat pumping for DHC.

Seya, Y., International District Heating and Cooling Association Annual Conference, 82nd, San Francisco, June 22-26, 1991, Washington, D.C., 1991, p.353-364.

Liquid cooling, Heat recovery, Heat transfer, Water, Heat sinks, Ice thermal properties.

46-3184

Direct freeze ice slurry district cooling system evaluation.

Winters, P.J., et al, International District Heating and Cooling Association Annual Conference, 82nd, San Francisco, June 22-26, 1991, Washington, D.C., 1991, p.381-398, 24 refs.

Kooy, R.J.

Cooling systems, Ice makers, Ice thermal properties, Slush.

46-3185
DHC using ground water heat pump, ice thermal storage and ammonia refrigerant technologies.
Berry, R.E., et al, International District Heating and Cooling Association Annual Conference, 82nd, San Francisco, June 22-26, 1991, Washington, D.C., 1991, p.457-471.
Jacobsen, D.R.
Ice thermal properties, Heat pipes, Heat transfer, Ground water, Heat sources, Heat sinks.

46-3186
Stable isotope results, Wilkes Land Oceanographic Expedition, 1985.
Michel, R.L., et al, *Antarctic journal of the United States*, 1990, 25(5), p.107-109, 5 refs.
Schroeder, R.A.
Ice composition, Ice shelves, Oceanographic surveys, Isotope analysis, Antarctica—Wilkes Land.
During Feb. 1985, an oceanographic investigation was carried out along the antarctic shelf break from 145E to 160E. Physical, chemical and biological data were collected to study the water masses in the region and their interaction, including the distribution of deuterium and oxygen-18. The results of the seawater analyses are given in a table, along with temperature, salinity, density, and oxygen data at the same depths. Data show that isotopic differences between water masses are near the analytical uncertainty, although there is some indication that the Warm Deep Water is slightly more positive and that the very cold shelf bottom waters are slightly more negative. Samples of pack ice also were collected by coring an ice floe on the shelf. This ice floe was approximately 4 m thick at the center, and stable isotopic compositions were determined from four depths. During the freezing process, a marked isotopic fractionation occurs with the ice becoming enriched in the heavy isotope.

46-3187
Winter Weddell Gyre Study, 1989: physical oceanography on board *Akademik Fedorov*.
Gordon, A.L., et al, *Antarctic journal of the United States*, 1990, 25(5), p.110-113, 3 refs.
Huber, B.A.
Sea ice, Oceanographic surveys, Air ice water interaction, Antarctica—Weddell Sea, Scotia Sea.
As part of a continuing international effort, science teams on board the icebreaking research vessels *Akademik Fedorov* and *Polarstern* carried out austral winter research in the Weddell Gyre in 1989. A cluster of closely spaced conductivity temperature-depth stations including a 1-week time series was obtained at a site west of Maud Rise, where summer-period data reveal the frequent presence of a large pool of warm deep water with associated high oceanic heat flux, the effects of which are evident in the sea-ice characteristics and from atmospheric boundary layer measurements. The combined *Fedorov-Polarstern* data provide a nearly synoptic view of the east-west spatial variability across the winter Weddell Gyre, including the gyre inflow in the east, the western boundary current, the central hub of the gyre, the downstream region from Maud Rise with the expected thermohaline perturbations, and across the northern boundary of the gyre in the Scotia Sea region.

46-3188
Winter Weddell Gyre Study 1989: nutrient, oxygen, and biomass chemistry on board F.S. *Polarstern*.
Gordon, L.I., et al, *Antarctic journal of the United States*, 1990, 25(5), p.113-115, 4 refs.
Jennings, J.C., Jr.
Oceanographic surveys, Chemical composition, Sea water, Ice composition, Antarctica—Weddell Sea.
The chemistry program of WWGS 89 was designed to provide an accurate, precise set of chemical data in order to quantify the Weddell Gyre circulation and the heat, salt, and chemical transports related to it at the end of the winter season. The surface mixed layer was found to be nearly homogeneous vertically in oxygen and nutrient concentrations. Dissolved oxygen was undersaturated below the pack ice, but no clear trend of increasing or decreasing undersaturation with location was seen along the main transect from the Antarctic Peninsula to Cape Norvegia. In the shallow sections the main body of the Weddell Gyre is easily distinguished from the outflowing western boundary current in the northwest and the inflowing coastal current in the southeast. Each terminus of the transect was characterized by very deep mixed layers, and only in the central gyre were there significant accumulations of nitrite and ammonium. The analyses of nutrient concentrations in ice core subsamples revealed considerable variability. Ammonium concentrations were usually much higher than in the underlying surface waters, and often higher than any normal seawater ammonium levels. Phosphate exhibited greater variability than did the other nutrients. There did not appear to be a strong correlation of nutrient concentration with ice structure or texture.

46-3189
Sea-ice studies on the Winter Weddell Gyre Study, 1989.
Meese, D.A., et al, *Antarctic journal of the United States*, 1990, 25(5), MP 3061, p.116-117, 4 refs.
Govoni, J.W., Lytle, V.I., Claffey, K., Ackley, S.F.
Ice cores, Ice surveys, Ice physics, Remote sensing, Snow, Sea ice, Ice composition.
The U.S. Army Cold Regions Research and Engineering Laboratory participated in the Winter Weddell Gyre Study, 1989 on both the *Polarstern* and the *Akademik Fedorov*. On the *Polarstern*, remote sensing work was performed with two radars, and the authors assisted in the ice properties studies. On the *Akademik Fedorov*, they conducted studies on the physical, optical, chemical, and biological properties of the sea ice and carried out a detailed ice thickness study. For 12 days during the study, the *Akademik Fedorov* was moored to an ice floe to conduct extensive oceanographic and ice studies. Ice cores were collected to sample all of the various ice types available. Optical measurements were taken at 5 different locations in the area according to various ice type and thickness. In addition, five thickness profiles including a grid were taken through all anomalous locations, and one was taken in the usual manner to determine variations that may exist.

46-3190
Snow and sea-ice thicknesses: Winter Weddell Gyre Study, 1989.
Meese, D.A., et al, *Antarctic journal of the United States*, 1990, 25(5), MP 3062, p.118, 6 refs.
Govoni, J.W., Ackley, S.F.
Sea ice, Ice cover thickness, Snow depth, Snow cover effect, Antarctica—Weddell Sea.
During the Winter Weddell Gyre Study, 1989, 2,650 thickness holes were drilled at 29 different sites in the pack ice on the Weddell Sea from the Soviet icebreaker *Akademik Fedorov*. The primary objective of the study was to determine ice thickness, snow thickness, and freeboard variations within and among floes, and to examine the variations of these properties with geographic location in the Weddell Sea. Snow thicknesses ranged from 0 to 80 cm with a mean of 17.9 cm, ice thicknesses ranged from 0 to 279 cm with a mean of 64.9 cm, and freeboards ranged from -32 to 55 cm with a mean of 1.5 cm. Negative freeboards indicate that the top ice surface is below sea level; flooding of the ice was often observed at these locations. The values were visually examined in relation to latitude and longitude to determine if there was any consistent variation over the cruise track. A consistent trend was not evident.

46-3191
Brightness temperature measurements, at 611 megahertz, of sea ice in the Weddell Sea.
St. Germain, K., et al, *Antarctic journal of the United States*, 1990, 25(5), p.119-120, 3 refs.
Swift, C.T.
Microwaves, Temperature measurement, Brightness, Sea ice, Ice cover thickness, Radiometry.
As part of the Winter Weddell Gyre Experiment 1989, the feasibility of measuring antarctic sea-ice thickness remotely was investigated by using passive microwave techniques. This required the installation of a 611 megahertz radiometer on board the West German research vessel *Polarstern*. A microwave radiometer measures the power level of incoming radiation. This power level is commonly expressed as a "brightness temperature". A figure shows the estimated percentage of error in the measurement as a function of sea-ice thickness, based on an assumed brightness temperature error of +/- 3 Kelvin. This curve demonstrates that it is theoretically possible to derive ice thickness for sea ice up to 1 m thick. The measurements should provide very useful surveys of antarctic ice thickness.

46-3192
Optical measurements on sea ice from the Weddell Sea, Antarctica.
Govoni, J.W., et al, *Antarctic journal of the United States*, 1990, 25(5), MP 3063, p.121-122, 6 refs.
Meese, D.A., Perovich, D.K.
Ice physics, Ice structure, Sea ice, Optical properties, Ice composition, Snow cover, Antarctica—Weddell Sea.
During the 1989 Winter Weddell Gyre Study, combined optical and physical properties measurements were made of first-year sea ice in the Weddell Sea. Optical measurements consisted of incident, reflected, and transmitted spectral irradiances. An essential adjunct to the optical measurements was a complete characterization of the physical state and structure of the ice. This was accomplished by taking two ice cores from each site. When snow cover was present, its depth and stratigraphy were also recorded. Snow cover properties were characterized in terms of depth, density, grain size, and temperature for each layer. Photographs were also taken at each site and a general description of the ice, snow, and sky conditions was recorded.

46-3193
Radar backscatter measurements during the Winter Weddell Gyre Study.
Lytle, V.I., et al, *Antarctic journal of the United States*, 1990, 25(5), MP 3064, p.123-125, 5 refs.
Jezek, K.C., Gogineni, S.P., Moore, R.K., Ackley, S.F.
Snow, Sea ice, Ice surface, Radar, Ice cover thickness, Ice composition, Ice density, Antarctica—Weddell Sea.
Data primarily taken over first and second year ice during the Weddell Sea cruise of F.S. *Polarstern* in Sep. and Oct. 1989 are discussed. Radar measurements were conducted in conjunction with detailed snow and ice measurements, including snow and ice thickness, surface roughness, salinities, and densities. One of the salient features found in the Weddell Sea second year ice, in contrast to arctic second year ice, was a deep snow cover which depressed the ice surface below sea level, causing brine to infiltrate into the snow and creating a highly saline layer at the snow/ice interface. An associated slush layer was observed where the snow had been flooded but had not refrozen. Because of either the high salinity layer or the presence of slush at the snow/ice interface observed in the Weddell Sea, the radar penetration depth is less, leading to a reduction in volume scattering relative to arctic sea ice.

46-3194
Methane emissions from Alaska arctic tundra in response to climatic change.
Livingston, G.P., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.372-377, 29 refs.
Morrissey, L.A.
Tundra, Soil air interface, Soil chemistry, Atmospheric composition, Climatic changes, Global warming, Wetlands, Soil temperature, Polar atmospheres.

46-3195
Toolik Lake Project: terrestrial and freshwater research on change in the Arctic.
Hobbie, J.E., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.378-383, 2 refs.
Peterson, B.J., Shaver, G.R., O'Brien, W.J.
Tundra, Climatic changes, Research projects, Nutrient cycle, Ecosystems, Lakes, Streams.

46-3196
Paleolimnologic evidence of high arctic late Quaternary paleoenvironmental change: Truelove Lowland, Devon Island, N.W.T., Canada.
King, R.H., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.384-389, 24 refs.
Smith, I.R., Young, R.B.
Lakes, Bottom sediment, Paleoclimatology, Stratigraphy, Tundra, Limnology, Marine deposits, Canada - Northwest Territories - Devon Island.

46-3197
Sensitivity of ecosystem CO2 flux in the boreal forests of interior Alaska to climatic parameters.
Bonan, G.B., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.391-395, 13 refs.
Forest ecosystems, Photosynthesis, Climatic changes, Taiga, Plant physiology, Biomass, Carbon dioxide, Atmospheric composition, Nutrient cycle.

46-3198
Possible impacts of ozone depletion on trophic interactions and biogenic vertical carbon flux in the southern ocean.
Marchant, H.J., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.397-400, 46 refs.
Davidson, A.T.
Ozone, Ice edge, Biomass, Algae, Ultraviolet radiation, Survival, Nutrient cycle, Ecology, Marine biology.
Recent investigations indicate that antarctic marine phytoplankton are presently UV stressed. The extent to which increasing UV radiation diminishes the ability of phytoplankton to fix CO2 and/or leads to changes in their species composition is equivocal. The colonial stage in the life cycle of the alga *Phaeocystis pouchetii* is one of the major components of the bloom. It has been found that this alga produces extracellular products which are strongly UV-B absorbing. When exposed to increasing levels of UV-B radiation, survival of antarctic colonial *Phaeocystis* was significantly greater than colonies of this species from temperate waters and of the single-celled stage of its life cycle which produces no UV-B-absorbing compounds. *Phaeocystis* is apparently a minor dietary component of antarctic krill, *Euphausia superba*, and its nutritional value to crustacea is reportedly low. Phytoplankton, principally diatoms, together with fecal pellets and molted exoskeletons of grazers contribute most of the particulate carbon flux from the euphotic zone to deep water. If the species composition of antarctic phytoplankton were to shift in favor of *Phaeocystis* at the expense of diatoms, changes to pelagic trophic interactions as well as vertical carbon flux would be likely.

46-3199
Effect of climatic change on farming and soil erosion in southern Greenland during the last thousand years.
Jakobsen, B.H., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.406-410, 5 refs.
Climatic changes, Soil erosion, History, Agriculture, Greenland.

46-3200
Trajectory analysis of the atmospheric carbon dioxide bimodal distribution in the Arctic.
Higuchi, K., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.412-415, 3 refs.
Trivett, N.B.A.
Polar atmospheres, Atmospheric circulation, Atmospheric composition, Carbon dioxide.

46-3201
Microbial mineralization in soils and plant material from Antarctica.
Bölter, M., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.418-422, 13 refs.
Soil microbiology, Soil chemistry, Lichens, Antarctica—Wilkes Land, Antarctica—King George Island.
The process of microbial mineralization was analyzed in soil samples and plant material, mainly lichens, from the maritime and continental Antarctic to examine effects of temperature and moisture. Three methods were used: total CO2-evolution and biological oxygen demand as a measure of general metabolic activity, and remineralization of C-14 labeled glucose (which may serve as a model for dissolved organic matter) as a measure of the activity of heterotrophic microorganisms. These methods are used as indicators for different fractions of organic material and microbial populations. A comparison of the results of these methods showed that the portion of respired material from C-14 labeled glucose may even exceed the totally metabolized material. These data differ with respect to the parent material, and thus give an indication of its quality and the actual activity of the bacterial population which is considered to be mainly responsible for the turnover and mineralization of dissolved organic matter. (Auth.)

46-3202
Effects of point source atmospheric pollution on boreal forest vegetation of northwestern Siberia.
Vlasova, T.M., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.423-428, 4 refs.
Kovalev, B.I., Filipchuk, A.N.
Air pollution, Forest tundra, Atmospheric composition, Plant ecology, Plant physiology, Human factors, Forest ecosystems, USSR—Noril'sk.

46-3203
In the footsteps of Robert Marshall: proposed research of white spruce growth and movement at the tree limit, central Brooks Range, Alaska.
Droessler, T.D., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.431-434, 20 refs.
Forest lines, Climatic changes, History, Growth, Vegetation patterns, United States—Alaska—Brooks Range.

46-3204
Changes in the source/sink relationships of the Alaskan boreal forest as a result of climatic warming.
Yarie, J., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.436-439, 11 refs.
Van Cleve, K.
Atmospheric composition, Forest ecosystems, Global warming, Climatic changes, Taiga, Biomass, Plant physiology, Nutrient cycle, Carbon dioxide, Photosynthesis.

46-3205
Holocene meltwater variations recorded in antarctic coastal marine benthic assemblages.
Berkman, P.A., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.440-449, 57 refs.
Glacier melting, Paleoclimatology, Bottom sediment, Ice sheets, Meltwater, Marine deposits, Fossils, Global warming, Antarctica—McMurdo Sound.
Climate changes can influence the input of meltwater from the polar ice sheets. In Antarctica, signatures of meltwater input during the Holocene may be recorded in the benthic fossils which exist at similar altitudes above sea level in emerged beaches around the continent. Interpreting the fossils as meltwater proxy records would be enhanced by understanding the modern ecology of the species in adjacent marine environments. Characteristics of an extant scallop assemblage in West McMurdo Sound have been evaluated across a summer meltwater gradient to provide examples of meltwater records that may be contained in proximal scallop fossils. Integrating environmental proxies from coastal benthic assemblages around Antarctica, over ecological and geological time scales, is a necessary step in evaluating the marginal responses of the ice sheets to climate changes during the Holocene. (Auth.)

46-3206
Long-term monitoring of airborne pollen in Alaska and the Yukon: possible implications for global change.
Anderson, J.H., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.453-459, 14 refs.
Pollen, Global change, Atmospheric composition, Phenology.

46-3207
Potential effects of global warming on calving caribou.
Eastland, W.G., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.460-464, 25 refs.
White, R.G.
Snow melting, Phenology, Global warming, Animals, Tundra, Vegetation factors.

46-3208
Growing season length and climatic variation in Alaska.
Sharratt, B.S., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.465-467, 11 refs.
Climatic changes, Phenology, Air temperature, Seasonal variations, Growth, United States—Alaska.

46-3209
State and dynamics of snow and ice resources in the arctic region derived from data in the World Atlas of Snow and Ice Resources.
Kotliakov, V.M., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.477-480, 6 refs.
Dreier, N.N.
Snow cover distribution, Glacier surveys, Ice surveys, Snow surveys, Meltwater, Maps.

46-3210
Mass balance of Antarctica and sea level change.
Bentley, C.R., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.481-488, 46 refs.
Giovinetto, M.B.
Glacier mass balance, Sea level, Glacier surveys, Ice sheets, Ice shelves, Icebergs, Antarctica.
The overall mass balance of the antarctic ice sheet has been estimated by comparison of the best available data on input in the form of snowfall with output in the form of ice flux through gates at or near the margin of the ice sheet. Surface melt is a negligible contributor to mass balance and has been ignored. Bottom melt under large ice shelves remains a major source of uncertainty. It is concluded that there is probably an excess input of 2-25% of the total input, equivalent to a sea level lowering of 0.1-1.1 mm/yr. Although errors remain, it becomes increasingly clear that an antarctic contribution to current sea level rise is unlikely. A reported iceberg flux that is larger than the mass input is attributed to a non-equilibrium breakback of the fronts of the ice shelves. (Auth.)

46-3211
Impact of global warming on the antarctic mass balance and global sea level.
Budd, W.F., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.489-494, 21 refs.
Simmonds, I.
Glacier mass balance, Sea level, Global warming, Ice sheets, Atmospheric circulation, Air ice interface, Polar atmospheres, Antarctica.
The present antarctic net accumulation and coastal ice flux each amount to about 2000 cu km/yr, both of which on their own would equate to approximately 6 mm/yr of sea level change. The present rate of sea level rise of about 1.2 mm/yr is therefore equivalent to about 20% imbalance in the antarctic mass fluxes. The magnitude of the changes to the antarctic precipitation and evaporation have been studied by a series of General Circulation Model experiments, using a model which gives a reasonable simulation of the present antarctic climate, including precipitation and evaporation. The experiments examine the changes in the antarctic precipitation (P) and evaporation (E) resulting separately from decreasing incrementally the antarctic sea ice concentration and from global warming accompanied by decreased sea ice cover. For total sea ice removal the changes obtained were P: +23%; E:-8%; (P-E): +48%. For global warming with sea ice reduction by about two thirds the changes were P: +47%; E: +22%; (P-E): +68%. This latter increase in mass flux is equivalent to about 4 mm/yr of sea level lowering which could provide a small but significant offset to the sea level rise expected from ocean thermal expansion and melting of temperate glaciers. (Auth. mod.)

46-3212
Post-Cromerian rise in sea level.
Olausson, E., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.496-498, 11 refs.
Paleoclimatology, Sea level, Pleistocene.
The intensified cooling in the Northern Hemisphere during the Elsterian-Saalian ice ages (isotopic stages 22-6) resulted in a reduction of the antarctic ice sheet by 10-15 million cu km, equal to a rise in sea level of about 40 m. This rise in sea level changed the hydrography of the Black Sea during the late Pleistocene warmer times, caused anoxic conditions in the eastern Mediterranean during the corresponding warming-up phases, and enhanced water transport of less saline water from the Pacific into the Arctic Ocean (the present sill depth of the Bering Strait is about 50 m). The increased supply of less saline water strengthened the halocline in the Arctic Ocean, increasing the sea ice there and, by higher albedo, its cooling effect on the adjacent continents. (Auth.)

46-3213
Response of permafrost to changes in paleoclimate.
Osterkamp, T.E., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.505-507, 3 refs.
Gosink, J.P., Fei, T., Zhang, T.
Permafrost thickness, Paleoclimatology, Soil air interface.

46-3214
Antarctic glacial geologic record and GCM modeling: a test.
Elliot, D.H., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.508-516, 60 refs.
Bromwich, D.H., Harwood, D.M., Webb, P.N.
Atmospheric circulation, Paleoclimatology, Glacier formation, Ice sheets, Glaciation, Glacial deposits, Marine deposits, Models, Antarctica.
A recent GCM (General Circulation Model) study of antarctic glaciation by Oglesby concluded that oceanic heat transport is relatively unimportant in the development and maintenance of antarctic glaciation; height and polar position, not the Antarctic Circumpolar Current, have led to thermal isolation; and surface elevation may be crucial for glaciation. Model results are here evaluated against the Pliocene geologic record for Antarctica. The Sirius Group, widely distributed in the Transantarctic Mountains, contains diatom floras suggesting open marine conditions in interior East Antarctica as recently as about 3 m.y.a. If the dating of the Sirius is correct and uplift rates have not been an order of magnitude higher, then polar location and elevation cannot be primary controls on the formation and subsequent fluctuations of the ice sheet. The cause of this discrepancy between modeling results and observations can be sought in limitations to the model (NCAR CCM1) used by Oglesby. Recent work with a coupled atmosphere-ocean GCM indicates that the atmosphere and ocean are strongly linked in high latitudes, and that this interaction is a dominant aspect of climatic variation on (at least) a decadal time scale. Initial results indicate that GCM performance generally needs to be enhanced and, in particular, that realistic interactive atmosphere-ocean models are needed. An improved geologic data base, particularly with respect to age determinations and amounts and rates of uplift, would facilitate model validation. (Auth. mod.)

46-3215
Glacier terminus fluctuations in the Wrangell and Chugach mountains resulting from non-climatic controls.
Sturm, M., et al, MP 3065, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.519-523, 26 refs.
Hall, D.K., Benson, C.S., Field, W.O.
Glacier oscillation, Glacier flow, Volcanoes, Mountain glaciers, Glacier surveys, Glacier beds, United States—Alaska.
Non-climatically controlled fluctuations of glacier termini were studied in two regions in Alaska. In the Wrangell Mountains, eight glaciers on Mt. Wrangell, an active volcano, have been monitored over the past 30 years using terrestrial surveys, aerial photogrammetry and digitally registered satellite images. Results, which are consistent between different methods of measurement, indicate that the termini of most glaciers were stationary or had retreated slightly. However, the termini of the 30-km-long Ahtna Glacier and the smaller Center and South MacKeith glaciers began to advance in the early 1960s and have advanced steadily at rates between 5 and 18 m yr since then. These three glaciers flow from the summit caldera of Mt. Wrangell near the active North Crater, where increased volcanic heating since 1964 has melted over 70 million cu m of ice. The authors suggest that volcanic meltwater has changed the basal conditions for the glaciers, resulting in their advance. In Col-

lege Fjord, Prince William Sound, the terminus fluctuations of two tidewater glaciers have been monitored since 1931 by terrestrial surveying, photogrammetry, and most recently, from satellite imagery. Harvard Glacier, a 40-km-long tidewater glacier, has been advancing steadily at nearly 20 m/yr since 1931, while the adjacent Yale Glacier has retreated at approximately 50 m/yr during the same period, though for short periods both rates have been much higher. The striking contrast between the terminus behavior of Yale and Harvard Glaciers, which parallel each other in the same fjord, and are derived from the same snow field, supports the hypothesis that their terminus behavior is the result of dynamic controls rather than changes in climate.

46-3216
Climate-related research in Svalbard.
Sand, K., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.525-531, 14 refs.
Hagen, J.O., Repp, K., Berntsen, E.
Research projects, Polar atmospheres, Climatic changes, Glacier surveys, Permafrost, Atmospheric composition, Norway—Svalbard.

46-3217
Paleotemperature reconstruction for freeze-thaw processes during the late Pleistocene through the Holocene.
Romanovskiĭ, V.E., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.537-542, 15 refs.
Maksimova, L.N., Seregina, N.V.
Paleoclimatology, Climatic changes, Permafrost distribution, Permafrost forecasting, Soil air interface, Glacier oscillation, Surface temperature.

46-3218
Freezing and thawing of soils under the influence of 300- and 90-year periods of temperature fluctuation.
Romanovskiĭ, V.E., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.543-548, 11 refs.
Garagulia, L.S., Seregina, N.V.
Permafrost forecasting, Climatic changes, Paleoclimatology, Soil air interface, Mathematical models.

46-3219
Microbiological weathering of silicates in permafrost.
Kol'chugina, T.P., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.549-551, 1 ref.
Fedosova, S.P.
Permafrost weathering, Soil microbiology, Frozen ground chemistry.

46-3220
Palynological data as tools for interpreting past climates: some examples from northern North America.
Anderson, P.M., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.557-564, 39 refs.
Palynology, Paleoclimatology, Paleobotany, Plant ecology, Fossils, Phenology, Vegetation patterns.

46-3221
High-latitude tree-ring data: records of climatic change and ecological response.
Graumlich, L.J., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.565-569, 17 refs.
Paleoclimatology, Phenology, Plant ecology, Climatic changes, Growth, Vegetation patterns, Forest lines.

46-3222
Polar ice cores: climatic and environmental records.
Lorius, C., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.570-575, 44 refs.
Ice cores, Paleoclimatology, Antarctica—Vostok Station.
Ice cores from Greenland and Antarctica provide multiple proxy records of climatic and environmental parameters. The deltaO-18 or deltaD records from the Vostok ice core strongly suggest the role of insolation orbital forcing, as well as a close relation between temperature and greenhouse gas concentrations. CO2 and CH4 concentrations increase by about 40% and 100% during glacial-interglacial transitions, respectively. It appears likely that fluctuating greenhouse gas concentrations have had a significant role in the glacial-interglacial climate changes by amplifying, together with the growth and decay of the Northern Hemisphere ice sheets, the orbital forcing. Climate sensitivity to greenhouse forcing estimated from paleo-ice core data is consistent with GCM simulations giving a 3-4 C warming for a future doubled atmospheric CO2. (Auth. mod.)

46-3223
Canadian ice caps as sources of environmental data.
Koerner, R.M., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.576-581, 30 refs.
Alt, B.T., Bourgeois, J.C., Fisher, D.A.
Ice cores, Paleoclimatology.

46-3224
Two-million-year-old insect fauna from north Greenland indicating boreal conditions at the Plio-Pleistocene boundary.
Böcher, J., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.582-584, 14 refs.
Paleoclimatology, Fossils, Paleobotany, Greenland.

46-3225
Record of global change in circum-antarctic marine sediments.
Barker, P.F., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.586-592, 50 refs.
Pudsey, C.J., Larter, R.D.
Paleoclimatology, Bottom sediment, Marine deposits, Global change, Antarctica.
Prograded sediments of the antarctic continental shelf and slope contain a record of glacial/interglacial changes in ice sheet volume. Modern piston-coring techniques are capable of revealing changes over the last glacial cycle in some detail, in suitably expanded sections. At lower sediment accumulation rates, a less detailed but longer record can be obtained. It can already be shown that, at and around glacial maximum, grounded ice sheets extended to the antarctic continental shelf edge, the marginal sea ice zone lay up to 5 deg farther north, and Weddell Sea Bottom Water flow was far slower than at present. These have implications for the carbon cycle in the oceans, which is of considerable importance in global change. (Auth. mod.)

46-3226
Paleoclimatic significance of high latitude loess deposits.
Begét, J.E., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.594-598, 32 refs.
Paleoclimatology, Loess, Eolian soils, Quaternary deposits.

46-3227
Global change and thermal history as recorded by northern North American tree-ring data.
Jacoby, G.C., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.599-605, 30 refs.
D'Arrigo, R.D.
Paleoclimatology, Phenology, Climatic changes, Surface temperature, Growth, Global change, Forest lines, Trees (plants).

46-3228
Spatial and temporal characteristics of the Little Ice Age: the antarctic ice core record.
Mosley-Thompson, E., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.606-610, 18 refs.
Thompson, L.G.
Paleoclimatology, Ice cores, Climatic changes, Isotope analysis, Dust, Antarctica—Siple Station, Antarctica—Amundsen-Scott Station.
This paper examines the temporal and spatial characteristics of the dust and deltaO-18 information from antarctic ice cores. Substantial differences exist in the records. For example, a 550-year record of deltaO-18 and dust concentrations from Siple Station suggests that warmer, less dusty conditions prevailed from A.D. 1600 to 1830. Alternately, dust and deltaO-18 from Amundsen-Scott Station indicate that opposite conditions (e.g., cooler and more dusty) were prevalent during the Little Ice Age (LIA). Three additional records provide further support for the LIA temperature opposition between the Antarctic Peninsula region and East Antarctica. In addition, periods of strongest LIA cooling are not temporally synchronous over East Antarctica. These strong regional differences demonstrate that a suite of spatially distributed, high resolution ice core records will be necessary to characterize the LIA in Antarctica. (Auth. mod.)

46-3229
Paleoenvironmental data from less-investigated polar regions.
Vaikmäe, R.A., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.611-616, 14 refs.
Paleoclimatology, Ice cores, Isotope analysis, Fossil ice, Permafrost origin, Antarctica—Novolazarevskaya Station.
This paper discusses the oxygen-18 variations in intermediate-depth ice cores from smaller ice caps of Svalbard and from the marginal area of the antarctic ice sheet, covering the time span from 1000 to 8000 years B.P. All profiles studied clearly reflect the main climatic events during this time interval. However, small shifts in time exist between details on different curves. Most probably this is due to certain asynchronity in climatic changes in the various regions. For paleoclimatic and paleopermafrost reconstructions, the isotopic content of polygonal wedge ice seems to be most promising. The attempts to use isotopic records from segregated ice for paleoenvironmental research is also discussed. (Auth. mod.)

46-3230
Little Ice Age glaciation in Alaska: a record of recent global climatic change.
Calkin, P.E., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.617-625, 64 refs.
Wiles, G.C.
Paleoclimatology, Climatic changes, Glacier oscillation, Glaciation, Global change, Mountain glaciers, Glacial deposits, United States—Alaska.

46-3231
Two late Quaternary pollen records from the upper Kolyma region, Soviet northeast: a preliminary report.
Anderson, P.M., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.628-632, 21 refs.
Paleoclimatology, Palynology, Lacustrine deposits, Bottom sediment, Paleobotany, Drill core analysis, Vegetation patterns, USSR—Kolyma River.

46-3232
Deglaciation and latest Pleistocene and early Holocene glacier readvances on the Alaska Peninsula: records of rapid climate change due to transient changes in solar intensity and atmospheric CO2 content?.
Pinney, D.S., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.634-640, 20 refs.
Begét, J.E.
Paleoclimatology, Glacier oscillation, Glacial deposits, Solar radiation, Carbon dioxide, Atmospheric composition, Polar atmospheres, United States--Alaska—Alaska Peninsula.

46-3233
Project CELIA: Climate and Environment of the Last Interglacial (Isotope Stage 5) in Arctic and Subarctic North America.
Brigham-Grette, J., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.644-648, 17 refs.
Paleoclimatology, Research projects, Glacier oscillation, Air ice water interaction, Permafrost distribution, Isotope analysis, Polar atmospheres.

46-3234
Proxy late Holocene climatic record deduced from northwest Alaska beach ridges.
Mason, O.K., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.649-657, 57 refs.
Jordan, J.W.
Paleoclimatology, Shoreline modification, Marine deposits, Beaches, Shore erosion, Sea level, Offshore landforms, Sediment transport, United States—Alaska—Seward Peninsula.

46-3235
Holocene loess and paleosols in central Alaska: a proxy record of Holocene climate change.
Bigelow, N.H., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.658-662, 24 refs.
Begét, J.E.
Paleoclimatology, Loess, Eolian soils, Stratigraphy, Soil dating, Radioactive age determination, United States—Alaska.

46-3236
Arctic haze and air pollution.
Pacyna, J.M., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.674-680, 55 refs.
Shaw, G.E.
Air pollution, Haze, Polar atmospheres, Atmospheric composition, Global change.

46-3237
Polar climate iteration?.
Hogan, A.W., et al, MP 3066, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.681-686, 38 refs.
Polar atmospheres, Atmospheric composition, Air masses, Air ice water interaction, Aerosols, Atmospheric circulation, Antarctica--Amundsen-Scott Station.
A continuous series of surface observations began at South Pole in 1974 and have continued to the present. Although a large seasonal variation in aerosol concentration is present, little year-to-year variation in mean seasonal aerosol concentration occurred prior to 1982. During the mid-1980s, a consistent diminution of mean annual aerosol concentration was observed, and a concurrent reduction in sodium concentration in snow and firn was reported. The decrease in aerosol concentration was greatest in late winter and spring, concurrent with decreases in mean air temperature and mean wind speed. This paper describes concurrent aerosol and meteorological data collected at South Pole from 1974 through 1987 and presents several analyses attempting to verify if these changes do reflect a persistent variation in the properties of the antarctic continental air mass. Additional analyses, using upper air and automatic weather station data, attempt to identify circulation changes related to these changes in aerosol concentration. (Auth. mod.)

46-3238
Role of the polar regions in the global carbon cycle and related climatic changes.
Borisenkov, E.P., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.687-692, 21 refs.
Polar atmospheres, Atmospheric composition, Atmospheric circulation, Climatic changes, Air water interactions, Carbon dioxide, Global warming, Mathematical models, Paleoclimatology.

46-3239
Review of arctic gas hydrates as a source of methane in global change.
Kvenvolden, K.A., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.696-701, 34 refs.
Polar atmospheres, Atmospheric composition, Global warming, Climatic changes, Natural gas, Hydrates, Subsea permafrost, Soil air interface.

46-3240
Depletion in antarctic ozone and associated climatic change.
Lal, M., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.703-706, 15 refs.
Ozone, Polar atmospheres, Global warming, Climatic changes, Atmospheric composition, Atmospheric circulation, Stratosphere.
The potential climatic effects of changes in the concentration of greenhouse gases on thermal structure of the antarctic atmosphere are examined, using both steady-state and time-dependent climate models. When the greenhouse effects of increases in methane, nitrous oxide, carbon dioxide and chlorofluorocarbons in association with decrease in ozone at the levels of maximum concentration are incorporated in radiative flux computations for the antarctic region, the net result is a surface warming which is in fair agreement with that inferred from mean antarctic temperature series. The stratospheric cooling due to the ozone hole phenomenon is not restricted only to the low and middle stratosphere but also extends deep into the upper antarctic stratosphere, particularly in the beginning of Nov. In view of this, it is considered possible that the polar stratospheric warming phenomenon associated with planetary wave events could be significantly disturbed by ozone depletion in the antarctic atmosphere, leading to appreciable perturbations in the general circulation. (Auth. mod.)

46-3241
Individual particle analysis of the springtime arctic aerosol, 1983-1989.
Sheridan, P.J., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.708-715, 23 refs.
Schnell, R.C., Kahl, J.D.
Polar atmospheres, Air pollution, Atmospheric composition, Haze, Aerosols, Atmospheric circulation.

46-3242
Deposition of metals from the atmosphere at the North Pole compared to background regions of the northwestern USSR.
Adamenko, V.N., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.716-719, 6 refs.
Kondrat'ev, K.IA., Siniakov, S.A.
Polar atmospheres, Air pollution, Atmospheric composition, Precipitation (meteorology), Atmospheric circulation.

46-3243
Seasonal change and chemical state of polar stratospheric aerosols.
Iwasaka, Y., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.720-729, 23 refs.
Polar atmospheres, Atmospheric composition, Aerosols, Stratosphere, Ozone, Seasonal variations, Antarctica--Showa Station.
Winter enhancement of stratospheric aerosols was measured at Showa Station by lidar. Electron microscope observation of individual particles, collected in the winter arctic stratosphere with a balloon-borne impactor, suggested that particles containing nitric acid were formed during the cold winter season, and the appearance of such particles was an important process causing the winter enhancement of polar stratospheric aerosols. An externally mixed state of nitric acid and sulfate particles was observed in the region of 18.8-19.6 km (the upper region of the sulfate particle layer) during the measurements of Jan. 31, 1990. One possible explanation of this is nitric acid particle sedimentation, which is considered to be an important process causing denitrification of the polar stratosphere and polar ozone depletion. (Auth. mod.)

46-3244
Tropospheric nitrogen oxide measurements at Barrow, Alaska.
Jaffe, D.A., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.730-734, 14 refs.
Honrath, R.E.
Polar atmospheres, Atmospheric composition, Air pollution, Ozone, Haze, United States—Alaska—Barrow.

46-3245
Ozone evolution peculiarities in the polar regions: analysis of observational data and results of modeling.
Mokhov, I.I., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.736-740, 7 refs.
Polar atmospheres, Atmospheric composition, Ozone.
Analysis of ozone evolution characteristics in intra-annual evolution of latitude-altitude and latitude-longitude atmospheric ozone concentration fields was carried out using a special method of amplitude-phase characteristics. TOMS satellite ozone data for the period 1978-1987 were used in the analysis. Comparison was made with results of analysis of total ozone evolution based on data obtained from the World Data Center of Ozone and from the Main Geophysical Observatory for the period 1973-1985 at 133 Northern and Southern Hemisphere stations. Latitude-altitude characteristics of the evolution of ozone concentrations from different satellite data are compared with results of simulations using a two-dimensional photochemical model of the atmosphere. There are large differences in ozone evolution in polar latitudes of the Northern and Southern Hemispheres in different stratospheric layers and for different seasons. It was noted that the "ozone hole" phenomenon is more pronounced in the Antarctic than in the Arctic. Comparison with results of standard harmonic analysis was also carried out. (Auth.)

46-3246
Volcanic eruption events and the variations in surface air temperature over high latitude regions.
Jia, P.Q., International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.744-747, 11 refs.
Polar atmospheres, Volcanic ash, Atmospheric composition, Air pollution, Volcanoes, Surface temperature, Air temperature.

46-3247
Satellite and slow-scan television observations of the rise and dispersion of ash-rich eruption clouds from Redoubt Volcano, Alaska.
Kienle, J., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.748-750, 1 ref.
Polar atmospheres, Atmospheric composition, Volcanic ash, Volcanoes, Air pollution, Atmospheric circulation, Stratosphere, United States—Alaska—Redoubt, Mount.

46-3248
Bromine and surface ozone atmospheric chemistry at Barrow, Alaska during spring 1989.
Sturges, W.T., et al, International Conference on the Role of the Polar Regions in Global Change, Fairbanks, June 11-15, 1990. Proceedings, Vol.2, Fairbanks, University of Alaska, Dec. 1991, p.751-755, 9 refs.
Schnell, R.C., Landsberger, S.
Polar atmospheres, Atmospheric composition, Ozone, Photochemical reactions, Air pollution, United States—Alaska—Barrow.

46-3249
Measured trends in stratospheric ozone.
Stolarski, R.S., et al, *Science*, Apr. 17, 1992, 256(5055), p.342-349, Refs. passim.
Ozone, Stratosphere, Atmospheric composition.
Recent findings, based on both ground-based and satellite measurements, have established that there has been an apparent downward trend in the total column amount of ozone over mid-latitude areas of the Northern Hemisphere in all seasons. Measurements of the altitude profile of the change in the ozone concentration have established that decreases are taking place in the lower stratosphere in the region of highest ozone concentration. Analysis of updated ozone records through Mar. 1991, including 29 stations in the former Soviet Union, and analysis of independently calibrated satellite data records from the Total Ozone Mapping Spectrometer and Stratospheric Aerosol and Gas Experiment instruments, confirm many of the findings originally derived from the Dobson record concerning northern mid-latitude changes in ozone. The data from many instruments now provide a fairly consistent picture of the change that has occurred in stratospheric ozone levels. An antarctic ozone hole update is included and several of the graph figures extend the survey to about 65S. (Auth. mod.)

46-3250
Oxygen supersaturation in ice-covered antarctic lakes: biological versus physical contributions.
Craig, H., et al, *Science*, Jan. 17, 1992, 255(5042), p.318-321, 8 refs.
Wharton, R.A., Jr., McKay, C.P.
Lake ice, Lake water, Oxygen, Water chemistry, Antarctica--Hoare, Lake.
Freezing in ice-covered lakes causes dissolved gases to become supersaturated while at the same time removing gases trapped in the ablating ice cover. Analysis of N2, O2, and Ar in bubbles from Lake Hoare ice shows that, while O2 is 2.4 times supersaturated in the water below the ice, only 11% of the O2 input to this lake is due to biological activity: 89% of the O2 is derived from meltwater inflow. Trapped bubbles in a subliming ice cover provide a natural "fluxmeter" for gas exchange: in Lake Hoare as much as 70% of the total gas loss may occur by advection through the ice cover, including 75% of the N2, 59% of the O2, and 57% of the Ar losses. The remaining gas fractions are removed by respiration at the lower boundary (O2) and by molecular exchange with the atmosphere in the peripheral summer moat around the ice. (Auth.)

46-3251
RV *Polarstern* Antarktis X/3-5 1992. Bremerhaven, Alfred-Wegener-Institut für Polar-und Meeresforschung, 1992, 43p., With German summary.
Expeditions, Sea ice, Ice formation, Research projects.
The German antarctic marine science program aboard FS *Polarstern*, Mar. through Aug. 1992, is presented. The cruise leg ANT X/3 commences in Cape Town, South Africa, on Mar. 27, 1992 and ends there on the May 19, 1992. The cruise track extends SSW-ward to the vicinity of Neumayer Station for studies at the ice edge. The major goal of this part of the expedition is to obtain a comprehensive picture of physical, chemical and biological processes associated with the onset of sea ice formation. Additional programs include a study of the continental water boundary in the eastern Weddell Sea, recovery and deployment of sediment trap moorings, programs on fish physiology, deep sea benthos and deep sea microbiology. A core goal of ANT X/4 is the ground truth program for the ERS-1, SAR and ATSR instruments, the RAR on the Russian OKEAN

satellite, the NOAA-AVHRR and the DMSP-SSM/I. Several characteristics of sea ice and snow such as salinity- and temperature-profiles, pore-size, texture, density, dielectric constant and small-scale surface roughness, will be determined for improvements of algorithms for satellite measurements. The main goal of the cruise leg ANT X/5, which is scheduled to start at Puerto Madryn on Aug. 8, 1992 and to end at Punta Arenas on Sep. 26, 1992, is a marine geological survey on transects in the southern Argentine Basin, the eastern Georgia Basin and in the area of the South Sandwich Trench, and the Scotia Sea involving isotope, micropaleontological and sedimentological investigations.

46-3252
Chlorofluorocarbons, stratospheric ozone, and the antarctic ozone hole.
Rowland, F.S., *Environmental conservation*, Summer 1988, 15(2), p.101-115, 69 refs.
Atmospheric composition, Chemical composition, Stratosphere, Ozone.
The momentous subject of chlorofluorocarbons (CFCs) and their effect on the biosphere's stratospheric ozone shield is treated rather generally, but in sufficient depth where necessary in three main sections dealing with (i) scientific background and current status of ongoing investigation, (ii) the major technological uses of CFCs and available or foreseeable alternatives to them, and (iii) the policy status and regulatory activity involving present or proposed future restrictions in CFC emissions. The general areas of major concern focus on the twin roles of ozone as: (a) a stratospheric shield against the penetration to the Earth's surface of biologically damaging ultraviolet radiation in the 280-320 nm wavelength band (designated as UV-B), and (b) the conversion of this energy absorbed by ozone into a stratospheric heat-source. A decrease in total ozone in the atmosphere permits increased penetration of UV-B in the ratio of ~1% in O3 + 2% in UV-B. The major direct effects of increased UV-B on man are increased incidences of skin cancer and eye cataracts, and perhaps some suppression of the immune system.

46-3253
Organic carbon sorption in arctic and subalpine spodosol B horizons.
Dahlgren, R.A., et al, *Soil Science Society of America. Journal*, Sep.-Oct. 1991, 55(5), p.1382-1390, 42 refs.
Marrett, D.J.
Podsol, Soil water, Soil chemistry, Absorption, Soil formation, Solubility, Biomass, Chemical properties, Temperature effects, Organic soils.

46-3254
Freezing effects on aggregate stability affected by texture, mineralogy, and organic matter.
Lehrsch, G.A., et al, *Soil Science Society of America. Journal*, Sep.-Oct. 1991, 55(5), p.1401-1406, 25 refs.
Sojka, R.E., Carter, D.L., Jolley, P.M.
Soil tests, Soil aggregates, Soil texture, Frost action, Stability, Soil freezing, Freeze thaw cycles, Water content.

46-3255
Inertially coupled galloping of iced conductors.
Yu, P., et al, *Journal of applied mechanics*, Mar. 1992, 59(1), p.140-145, 13 refs.
Shah, A.H., Popplewell, N.
Power line icing, Stability, Ice loads, Oscillations, Wave propagation, Analysis (mathematics), Countermeasures, Mechanical properties.

46-3256
Geometrical approach assessing instability trends for galloping.
Yu, P., et al, *Journal of applied mechanics*, Sep. 1991, 58(3), p.784-791, 10 refs.
Popplewell, N., Shah, A.H.
Power line icing, Ice loads, Stability, Wind factors, Oscillations, Analysis (mathematics), Countermeasures, Physical properties.

46-3257
Continuous measurement of the depth of water table (inundation) in wetlands with fluctuating surfaces.
Roulet, N.T., et al, *Hydrological processes*, Oct.-Dec. 1991, 5(4), p.399-403, 7 refs.
Hardill, S., Comer, N.
Wetlands, Peat, Water table, Measuring instruments, Design, Sensors, Subarctic landscapes, Hydrology.

46-3258
Contingency planning prevents million-dollar freeze-damage losses.
Leone, R., *Pulp & paper*, July 1991, 65(7), p.106-109.
Manufacturing, Freezing, Damage, Countermeasures, Winter maintenance.

46-3259
Wave-induced roll motion beneath an ice cover.
Melsom, A., *Journal of physical oceanography*, Jan. 1992, 22(1), p.19-28, 25 refs.
Ocean waves, Ice water interface, Subglacial observations, Wave propagation, Ocean currents, Ice cover effect, Sea ice, Stratification, Attenuation, Analysis (mathematics), Active layer.

46-3260
Condensation and sublimation of H2O ice in space.
Kouchi, A., Dynamic processes of material transport and transformation in the earth's interior. Edited by F. Marumo, Tokyo, Terra Scientific Publishing Company, 1990, p.453-462, 21 refs.
Extraterrestrial ice, High pressure ice, Ice physics, Ice sublimation, Condensation, Vapor pressure, Amorphous ice, Simulation, Low temperature research.

46-3261
Atmospheric aerosols—global climatology and radiative characteristics.
d'Almeida, G.A., et al, Hampton, VA, A. DEEPAK Publishing, 1991, 561p., Refs. passim.
Koepke, P., Shettle, E.P.
DLC QC882.42.D35 1991
Aerosols, Climatology, Solar radiation, Classifications, Radiation absorption, Polar atmospheres, Atmospheric density, Transmissivity, Scattering, Statistical analysis, Air pollution.
This book fills a current need for global aerosol climatology. The authors have carefully reviewed most of the available aerosol measurements. After describing the various sources of aerosols and the characteristics needed in a climatology, they define 22 aerosols and components by their size distribution and their refractive index from 0.3 to 40 microns. These components are used in external mixtures to build 12 aerosol types, distributed over the globe in bins of 5 deg x 5 deg and 3 or 4 altitude layers; the time resolution is a month, and the effect of relative humidity is included. This basic aerosol climatology is then used to compute radiative characteristics, based on Mie theory; some maps are presented as examples of this large data set. This book is an invaluable document to modellers and to all those who need information on the atmospheric aerosols. It also provides a framework for further work by the international community in its efforts to combine current and future aerosol measurements into an interactive database. (Auth. mod.)

46-3262
Alaska water issues. MP 3067, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, 209p., WRC-114, Refs. passim. Proceedings of the AWRA Alaska Section annual meeting, Apr. 9-10, 1992. For selected papers see 46-3263 through 46-3276.
Chacho, E.F., Jr., ed.
Water pollution, Water chemistry, Water reserves, Wetlands, Soil pollution, Water treatment, Permafrost hydrology, United States—Alaska.

46-3263
Thermal analysis of a buried chilled pipeline at stream crossings.
Rockwell, M.L., et al, Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, p.5-12, 10 refs. Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Carlson, R.F.
Gas pipelines, Underground pipelines, Pipeline freezing, River crossings, Soil freezing, Artificial freezing, Liquefied gases, Thermal analysis.

46-3264
Effect of ultrasound on polynuclear aromatic hydrocarbons in aqueous media.
Wheat, P.E., Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, p.13-18, 46 refs. Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Cavitation, Waste treatment, Underwater acoustics, Pollution, Mass transfer, Chemical properties.

46-3265
Seasonal dissolved inorganic nitrogen utilization in a subarctic Alaskan lake.
Gu, B., et al, Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, p.23-52, 50 refs. Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Alexander, V.
Water chemistry, Nutrient cycle, Lake water, Ice cover effect, Plankton, Seasonal variations.

46-3266
Thermally modified sand: an earth friendly alternative for treatment of icy roadways.
Gilfilian, R.E., Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, p.55-58, Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Road icing, Sanding, Road maintenance, Artificial freezing.

46-3267
Anchorage stormwater permit requirements.
Dunfee, R.B., Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992 p.59-67, Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Water pollution, Environmental protection, Legislation, Cost analysis, Runoff, Drains, Municipal engineering.

46-3268
Wetlands and urban stormwater: water quality option or regulatory nightmare.
Bacon, T.R., Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, p.69-83, 14 refs. Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Wetlands, Water pollution, Environmental protection, Legislation, Runoff, Water treatment, Municipal engineering.

46-3269
Travel distances of coarse sediment particles in rivers.
Burrows, R.L., et al, MP 3068, Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, p.89-90, 7 refs. Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Chacho, E.F., Jr., Emmett, W.W.
Sediment transport, Suspended sediments, River flow.

46-3270
Large volume water export potential from southeast Alaska.
Noll, R., et al, Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, p.91-96, Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Davidge, R.
Water reserves, Natural resources, Economic development, Marine transportation, Tanker ships, Legislation, International cooperation, United States—Alaska.

46-3271
White phosphorous contamination of an Alaskan salt marsh: Eagle River Flats.
Collins, C.M., et al, MP 3069, Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, p.99, Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Racine, C.H., Walsh, M.E.
Wetlands, Soil pollution, Environmental impact, Explosives, Bottom sediment, Military facilities, United States—Alaska—Fort Richardson.

46-3272
Climate change and arctic hydrology.
Alimchandani, S., Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, p.101-111, 14 refs. Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Global warming, Polar atmospheres, Permafrost hydrology, Soil air interface, Atmospheric circulation, Ground thawing.

46-3273
Properties of arctic wetlands.
Rovansek, R., Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, p.113-119, 9 refs. Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Wetlands, Permafrost hydrology, Suprapermafrost ground water, Soil air interface.

46-3274
Kenai River water quality investigation: annual progress report, 1989-1990.
Litchfield, V.P., et al, Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, p.125-171, 21 refs. Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Kyle, G.B.
River basins, Water chemistry, Water pollution, Water reserves, Natural resources, United States—Alaska—Kenai River.

46-3275
Overview of the water resources of the coastal plain of the Arctic National Wildlife Refuge.
Trawicki, J.M., Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, p.173-184, 17 refs. Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Water reserves, Permafrost hydrology, Wetlands, Permafrost beneath lakes, Permafrost beneath rivers, Ice cover effect, Hummocks, United States—Alaska—Arctic National Wildlife Refuge.

46-3276
Evaluation of precipitation measurements in the Arctic.
Clagett, G.P., Alaska water issues, Fairbanks, American Water Resources Association, Alaska Section. University of Alaska, Water Research Center, 1992, p.185-209, 19 refs. Presented at the AWRA Alaska Section annual meeting, Apr. 9-10, 1992.
Precipitation gages, Snowfall, Snow survey tools, Snow water equivalent, Tundra.

46-3277
Holocene variations of the Vedretta della Lobbia (Adamello Group, Central Alps). [Variazioni oloceniche della Vedretta della Lobbia (Gruppo dell'Adamello, Alpi Centrali)],
Baroni, C., et al, *Comitato glaciologico italiano. Bollettino. Ser. 3. Geografia fisica e dinamica quaternaria*, 1990, 13(2), p.105-119, In Italian with English summary. 42 refs.
Carton, A.
Paleoclimatology, Moraines, Glacial geology, Lichens, Geomorphology, Age determination, Italy—Alps.

46-3278
Glacial traces in the "Parco Nazionale d'Abruzzo" area (Central Apennines): preliminary note. [Le tracce glaciali nel Parco Nazionale d'Abruzzo (Appennino Centrale): nota preliminare],
Cinque, A., et al, *Comitato glaciologico italiano. Bollettino. Ser. 3. Geografia fisica e dinamica quaternaria*, 1990, 13(2), p.121-133, In Italian with English summary. 32 refs.
Pleistocene, Glaciation, Italy—Apennines.

46-3279
Greenland Ice-Core Project. A program of drilling in the Ice Cap by the European Science Foundation. [Il Progetto GRIP: Greenland Ice-Core Project. Un programma di perforazione della calotta groenlandese organizzato dalla European Science Foundation],
Maggi, V., *Comitato glaciologico italiano. Bollettino. Ser. 3. Geografia fisica e dinamica quaternaria*, 1990, 13(2), p.135-138, In Italian with English summary. 10 refs.
Paleoclimatology, Drilling, Ice cores, Greenland.

46-3280
Late Cenozoic glacial history of the Terra Nova Bay region, northern Victoria Land, Antarctica.
Orombelli, G., et al, *Comitato glaciologico italiano. Bollettino. Ser. 3. Geografia fisica e dinamica quaternaria*, 1990, 13(2), p.139-163, With Italian summary. 33 refs.
Baroni, C., Denton, G.H.
Glacial geology, Paleoclimatology, Geomorphology, Ice sheets, Climatic changes, Alpine glaciation, Antarctica—Terra Nova Bay, Antarctica—East Antarctica.
Glacial geological and geomorphological research in the Terra Nova Bay region was undertaken to decipher late Cenozoic ice-sheet behavior in northern Victoria Land. The work is part of a continuing program to understand and anticipate the response of the antarctic ice sheet to climatic change. The Transantarctic Mountains inland of Terra Nova Bay exhibit four major landscapes: 1) deep troughs propagated inland by headward cutting; 2) well-developed alpine glacial topography (with cirques, ridges, horns, and spurs); 3) relict summit mesas; and 4) undulating coastal piedmonts that are tilted seaward. Trimlines superimposed on the alpine and outlet-trough topography mark the maximum possible expansion of the northern Victoria Land ice cover since erosion of the alpine topography. This expansion was minor in the upper reaches of outlet glaciers and in mountain accumulation areas while it represented great thickening in the coastal area. There is no definitive evidence that the East Antarctic ice sheet overrode northern Victoria Land nunataks or mountains. Several glacial drifts have been differentiated. Terra Nova Bay drift (late Wisconsin) is well-exposed and preserved along coastal ice-free areas, where it was cut beginning 7,000-8,000 yr B.P. by beaches now up to 30 m above present sea level. The Terra Nova drift limit can be traced far inland along the main glaciers. During late Wisconsin time, the glacier thickening was greatest in coastal regions, where a grounded piedmont glacier filled Terra Nova Bay. The Terra Nova piedmont glacier was probably part of a marine-based ice sheet in the inner Ross Embayment. High-elevation striations in the Eisenhower Range seem to have been carved during Terra Nova glaciation. If so, local mesa ice caps and mountain glaciers expanded to feed the Terra Nova piedmont glacier during late Wisconsin time, unlike the situation farther south where alpine glacier termini in the Dry Valleys were less extensive than now during late Wisconsin time. (Auth. mod.)

46-3281
Studies of glacial traces on Mt. Timfi, Pindus Chain (Greece). [Osservazioni sulle tracce glaciali del M. Timfi, Catena del Pindo (Grecia)],
Palmentola, G., et al, *Comitato glaciologico italiano. Bollettino. Ser. 3. Geografia fisica e dinamica quaternaria*, 1990, 13(2), p.165-170, In Italian with English summary. 11 refs.
Boenzi, F., Mastronuzzi, G., Tromba, F.
Glacial geology, Moraines, Quaternary deposits, Greece—Pindus.

46-3282
Structural determination of the Val Pisella Rock Glacier (Upper Valtellina, Italy) by means of geoelectrical sounding. Results and problems. [Determinazione della struttura interna del Rock Glacier di Val Pisella (Alta Valtellina) attraverso sondaggi elettrici verticali. Risultati e problemi],
Resnati, C., et al, *Comitato glaciologico italiano. Bollettino. Ser. 3. Geografia fisica e dinamica quaternaria*, 1990, 13(2), p.171-177, In Italian with English summary. 23 refs.
Smiraglia, C.
Rock glaciers, Periglacial processes, Sounding, Geoelectricity, Electrical resistivity, Permafrost thickness, Italy—Valtellina.

46-3283
Periglacial deposits in Sardinia: the blockstreams near Pranu Mannu.
Ginesu, S., *Comitato glaciologico italiano. Bollettino. Ser. 3. Geografia fisica e dinamica quaternaria*, 1990, 13(2), p.179-181. With Italian summary. 10 refs.
Periglacial processes, Pleistocene, Italy—Sardinia.

46-3284
Preliminary measurements of the northern glacier of Tarn Flat (Victoria Land, Antarctica). [Misure preliminari sul ghiacciaio settentrionale di Tarn Flat (Terra Vittoria, Antartide)],
Meneghel, M., *Comitato glaciologico italiano. Bollettino. Ser. 3. Geografia fisica e dinamica quaternaria*, 1990, 13(2), p.183-185, In Italian with English summary. 8 refs.
Glacier surveys, Glacier tongues, Glacier oscillation, Glacier ablation, Glacier alimentation, Glacial erosion, Antarctica—Victoria Land.
The work reports the survey made on a small glacier mainly fed by wind blown snow in the deglaciated area of Tarn Flat, during the 5th Italian expedition of the Programma Nazionale di Ricerche in Antartide. A net of 15 stakes has been placed on the glacier to measure deformations, velocity, and accumulation and ablation rates. To check the position of the snout 5 points have been arranged. This glacier, because of its small size, could give clear evidence of even weak environmental changes. (Auth.)

46-3285
Case of sudden evolution of Monviso glaciers: the ice avalanche of Upper Coolidge Glacier. [Un episodio parossistico nell'evoluzione dei ghiacciai del Gruppo del Monviso: il crollo del Ghiacciaio Superiore di Coolidge],
Mortara, G., et al, *Comitato glaciologico italiano. Bollettino. Ser. 3. Geografia fisica e dinamica quaternaria*, 1990, 13(2), p.187-189, In Italian with English summary. 4 refs.
Dutto, F.
Avalanche formation, Avalanche mechanics, Climatic factors, Italy—Alps.

46-3286
Reports on the glaciological survey of 1989. [Relazioni della campagna glaciologica 1989],
Armando, E., et al, *Comitato glaciologico italiano. Bollettino. Ser. 3. Geografia fisica e dinamica quaternaria*, 1990, 13(2), p.191-239, In Italian.
Smiraglia, C., Zanon, G.
Glacier surveys, Glacier oscillation, Climatic factors.

46-3287
Motion of a granular avalanche in an exponentially curved chute: experiments and theoretical predictions.
Hutter, K., et al, *Royal Society of London. Philosophical transactions*, Jan. 15, 1991, 334A(1633), p.93-138, 23 refs.
Koch, T.
Avalanche mechanics, Avalanche forecasting, Rheology, Internal friction, Mass flow, Simulation, Mathematical models, Correlation.

46-3288
Ultra-trace analysis of heavy metals in ice and snow from the Antarctic and Greenland.
Boutron, C.F., et al, *Analusis*, Mar. 1992, 20(3), p.M24-M27, 16 refs.
Candelone, J.P., Görlach, U.
Air pollution, Snow impurities, Ice sheets, Metals, Chemical analysis, Sampling, Drill core analysis, Polar atmospheres, Laboratory techniques.
A record of the changes in concentrations of Pb, Cd, Hg and other heavy metals in the atmosphere of both hemispheres from prehistoric times to the present has been preserved in the successive dated ice and snow layers deposited in the large Greenland and antarctic ice caps. This paper describes the laboratory techniques required to decipher these archives, which has proved to be a major analytical challenge, due to the unique purity of polar ice and snow. At the extremely low concentrations involved, clean laboratories and ultrasensitive and contamination-free analytical techniques are required. (Auth. mod.)

46-3289
Icing test on a horizontal axis wind turbine.
Rong, J.Q., et al, *Wind engineering*, 1991, 15(2), p.109-113, 7 refs.
Bose, N., Brothers, C., Lodge, M.
Wind power generation, Electric equipment, Performance, Electric power, Ice accretion, Propellers, Freezing rain, Simulation, Air flow.

46-3290
Development and low temperature test of the generator of a wind turbine system for Antarctica.
Kimura, S., et al, *Wind engineering*, 1991, 15(2), p.114-127, 6 refs.
Ishizawa, K., Susuki, K.
Electric equipment, Electric power, Wind power generation, Cold weather performance, Design, Wind factors, Low temperature tests.
This paper describes the low temperature testing of a wind turbine system to be utilized for producing and supplying electricity to an observation camp in Antarctica. The generator installed in the wind turbine system was newly designed. Test results indicate that the generator will perform efficiently even in the low temperature corresponding to that of the observation camp. (Auth. mod.)

46-3291
Upper ocean general circulation model for climate studies: global simulation with seasonal cycle.
Yuen, C.W., et al, *Climate dynamics*, Feb. 1992, 7(1), p.1-18, 60 refs.
Cherniawsky, J.Y., Lin, C.A., Mysak, L.A.
Climatology, Ocean currents, Simulation, Atmospheric circulation, Sea ice distribution, Climatic factors, Heat balance, Air ice water interaction, Periodic variations.
In this paper the global ocean circulation with a seasonal cycle has been simulated with a two-and-a-half layer upper-ocean model. This model was developed for the purpose of coupling to an atmospheric general circulation model for climate studies on decadal time scales. A thermodynamic sea-ice model is coupled to the mixed layer. The model is forced at the surface with seasonally varying (a) observed wind stress, (b) heat fluxes, as defined by an atmospheric equilibrium temperature, and (c) Newtonian-type surface salt fluxes. The overall global distributions of mixed layer temperature, salinity and thickness are favorably reproduced. Sea ice distributions agree well with observations except in the interiors of the Ross and Weddell Seas. A realistic time rate of change of heat storage is simulated. There is also realistic heat transport from low to high latitudes. (Auth. mod.)

46-3292
Arctic radiation deficit and climate variability.
Graf, H.F., *Climate dynamics*, Feb. 1992, 7(1), p.19-28, 44 refs.
Climatic changes, Air temperature, Snow cover distribution, Solar radiation, Radiation balance, Aerosols, Atmospheric attenuation, Volcanic ash, Simulation, Climatic factors.

46-3293
Numerical modeling of the convective snow cloud over the Sea of Japan—precipitation mechanism and sensitivity to ice crystal nucleation rates.
Ikawa, M., et al, *Meteorological Society of Japan. Journal*, Dec. 1991, 69(6), p.641-667, With Japanese summary. 39 refs.
Cloud physics, Precipitation (meteorology), Snow pellets, Ice crystal growth, Cloud droplets, Weather forecasting, Simulation, Meteorological factors, Homogeneous nucleation.

46-3294
Interfacial and bulk electrolyte properties in frozen electrolyte studies.
Borkowska, Z., et al, *Electrochimica acta*, Mar. 1992, 37(3), p.565-568, 24 refs.
Cappadonia, M., Stimming, U.
Frozen liquids, Dielectric properties, Ice electrical properties, Clathrates, Hydrates, Charge transfer, Water structure, Electrical resistivity, Layers, Proton transport.

46-3295
Chemistry of a near-shore lake region during spring snowmelt.
Gubala, C.P., et al, *Environmental science & technology*, Dec. 1991, *25(12), p.2024-2030, 38 refs.*
Driscoll, C.T., Newton, R.M., Schofield, C.L.
Lake water, Chemical properties, Water pollution, Snowmelt, Snow impurities, Runoff, Limnology, Ecology, Sampling, Hydrology.

46-3296
Chronology and sources of anthropogenic trace metals in sediments from small, shallow arctic lakes.
Hermanson, M.H., *Environmental science & technology*, Dec. 1991, 25(12), p.2059-2064, 50 refs.
Lake water, Metals, Water pollution, Bottom sediment, Air pollution, Waste disposal, Sampling, Sewage, *Lacustrine deposits.*

46-3297
Fractionation of cesium isotopes and Sr-90 in snowmelt run-off and lake waters from a contaminated Norwegian mountain catchment.
Salbu, B., et al, *Journal of radioanalytical and nuclear chemistry- -articles*, Jan. 1992, 156(1), International Conference on Low-level Measurements of Actinides and Long-lived Radionuclides in Biological and Environmental Samples, 3rd, Bombay, India, Jan. 29-Feb. 2, 1990. Proceedings. Edited by N.P. Singh, p.7-20, 16 refs.
Björnstad, H.E., Brittain, J.E.
Lake water, Runoff, Fallout, Snow impurities, Radioactive isotopes, Snowmelt, Sampling, Water transport, Colloids, Watersheds.

46-3298
Freeze concentration beats the heat.
Rosen, J., *Mechanical engineering*, Dec. 1990, 112(12), p.46-50.
Freezing, Manufacturing, Freezers, Performance, Cost analysis.

46-3299
***Inelastic incoherent neutron scattering study of ice* Ih, II, IX, V and VI in the region from 50-500 meV.**
Li, J.C., et al, *Journal of physics: condensed matter*, Mar. 2, 1992, 4(9), p.2109-2116, 24 refs.
High pressure ice, Ice physics, Ice spectroscopy, Neutron scattering, Molecular structure, Molecular energy levels, Spectra, Neutron irradiation, Latticed structures.

46-3300
Particle sizing by laser diffraction spectrometry in the anomalous regime.
Kusters, K.A., et al, *Applied optics*, Nov. 20, 1991, *30(33), p.4839-4847, 17 refs.*
Wijers, J.G., Thoenes, D.
Light scattering, Lasers, Ice crystal optics, Particle size distribution, Dispersions, Ice spectroscopy, Accuracy, Refractive [illegible]ce crystal growth.

46-3301
Energy-optimized structure of antifreeze protein and its binding mechanism.
Chou, K.C., *Journal of molecular biology*, Jan. 20, 1992, 223(2), p.509-517, 33 refs.
Antifreezes, Molecular structure, Molecular energy levels, Microbiology, Ice crystal structure, Hydrogen bonds, Orientation, Simulation, Stereo mapping.

46-3302
Organolead in the remote environment—a challenge for the analyst.
Lobinski, R., et al, *Analusis*, Mar. 1992, 20(3), p.M28-M31, 3 refs.
Adams, F.C.
Fuels, Air pollution, Polar atmospheres, Snow impurities, Ice sheets, Sampling, Chemical analysis, Environmental *impact.*

46-3303
Simple mathematical model for rime and glaze-ice *accretion due to freezing rain on a horizontal plane* surface.
Poots, G., et al, *Atmospheric environment*, Apr. 1992, 26A(6), p.1029-1040, 30 refs.
Skelton, P.L.I.
Ice accretion, Liquid solid interfaces, Glaze, Hoarfrost, Phase transformations, Raindrops, Heat transfer, Power line icing, Mathematical models, Boundary value problems.

46-3304
Red Dog: Cominco's arctic experience pays off again.
Kral, S., *Mining engineering*, Jan. 1992, 44(1), p.43-49, 2 refs.
Mining, Cold weather operation, Quarries.

46-3305
Field measurement of anchor forces, ground temperatures, and pore-water pressures behind a retaining structure in northwestern Ontario.
Eigenbrod, K.D., et al, *Canadian geotechnical journal*, Feb. 1992, 29(1), p.112-116, With French summary. 6 refs.
Burak, J.P.
Supports, Anchors, Soil pressure, Frost action, Loads (forces), *Soil temperature*, Mechanical properties, Pile structures.

46-3306
***Effects of freezing* on the infrastructure of clay roads in Quebec.** [Effets du gel sur les infrastructures routières argileuses au Québec],
Roy, M., et al, *Canadian geotechnical journal*, Feb. 1992, 29(1), p.131-142, In French with English summary. 10 refs.
Roadbeds, Subgrade soils, Damage, Frost action, Freeze thaw cycles, Bearing strength, Mechanical properties, Excavation.

46-3307
Effect of microcracking on the deformation of ice.
Jordaan, I.J., et al, *Canadian geotechnical journal*, Feb. 1992, 29(1), p.143-150, With French summary. 18 refs.
Stone, B.M., McKenna, R.F., Fuglem, M.K.
Ice deformation, Ice mechanics, Ice strength, Cracking (fracturing), Rheology, Analysis (mathematics), Ice solid interface, Dynamic loads.

46-3308
Sensitivity of soil freezing simulated by the SHAW model.
Flerchinger, G.N., *American Society of Agricultural Engineers. Transactions*, Nov.-Dec. 1991, 34(6), p.2381-2389, 27 refs.
Soil freezing, Frost penetration, Simulation, Soil temperature, Accuracy, Frost forecasting, Hydrology, Physical properties.

46-3309
Benefits of wheat stubble strips for conserving snow in southwestern Saskatchewan.
Campbell, C.A., et al, *Journal of soil and water conservation*, Jan.-Feb. 1992, 47(1), p.112-115, 21 refs.
Snow retention, Agriculture, Snowmelt, Soil water, Vegetation factors, Water storage, Seepage, Snow cover effect, Snow hydrology.

46-3310
Precipitation types in the transition region of winter storms.
Stewart, R.E., *American Meteorological Society. Bulletin*, Mar. 1992, 73(3), p.287-296, Refs. p.294-296.
Precipitation (meteorology), Classifications, Storms, Boundary layer, Winter, Snow pellets, Ice storms.

46-3311
Major elements, nutrients, and plankton biomass in the ice edge and an offshore region of the Indian Ocean sector of the southern ocean.
Shirodkar, P.V., et al, *Polar record*, Apr. 1992, 28(165), p.127-136, 28 refs.
Goes, J.I., Alagarsamy, R., Fondekar, S.P.
Ice edge, Biomass, Nutrient cycle, Ecology, Plankton, Chlorophylls, Indian Ocean.
Physico-chemical and biological studies during summer of 1986-1987 in the ice-edge and a region offshore of Antarctica indicated significant spatial differences in concentrations of nutrients, dissolved oxygen (DO), Ca, Mg, and chlorophyll *a*, and in the rates of primary production. The waters within the ice-edge region were richer in nutrients and DO and showed a four-fold increase in chlorophyll *a* and a 10- fold increase in primary productivity as compared with offshore waters. In the ice-edge region, Mg was high, whereas values of Ca were within the normal range. Offshore Ca and Mg were within the expected limits. Nutrients in the ice-edge region showed increasing concentrations at deeper levels, irrespective of their relationship with DO, indicating large amounts of preformed nutrients, a characteristic of antarctic waters attributable to intense upwelling. Chlorophyll *a* showed a direct relation with primary productivity and an inverse relation with Mg, suggesting the release of Mg from biogenic matter. Offshore, phosphate-phosphorus *(PO4-P) was significantly correlated with nitrate-nitrogen* (NO3-N) and inversely correlated with primary productivity and chlorophyll *a*, indicating the utilization of PO4-P during high production. Significantly elevated concentrations of chlorophyll *a*, primary productivity and Mg, marked by a considerable decrease in nutrients, were observed at a frontal zone between 64 and 62S. (Auth. mod.)

46-3312
Source and calving of ice island ARLIS-II.
Jeffries, M.O., *Polar record*, Apr. 1992, 28(165), p.137-144, 15 refs.
Ice islands, Calving, Glacial geology, Origin.

46-3313
***Mixing characteristics of submerged and surface* wastewater outfalls at McMurdo Station.**
Railsback, S.F., *Polar record*, Apr. 1992, 28(165), p.149-154, 7 refs.
Ice melting, Ice water interface, Wastes, Water treatment, Computerized simulation, Antarctica—McMurdo Station.
The mixing characteristics of the existing surface wastewater discharge and a proposed submerged wastewater outfall at McMurdo Station are compared. The wastewater is a combination of sanitary sewage and brine from a desalination plant. Dispersion from a proposed submerged (15 m-deep) outfall was simulated using the CORMIX1 computer model. The mixing characteristics of the surface discharge were estimated from visual observations and a conceptual analysis. The wastewater was found to be less dense than ambient seawater. From the submerged outfall, the effluent is predicted to be diluted by ratios ranging from 80:1 to 450:1 between the point of discharge and the point where the effluent plume begins to spread out underneath the sea ice. The variation in dilution depends mostly on tidal current speed, and dilution of the wastewater with desalinator brine is predicted to provide only minor reductions in concentrations of the effluent. The heat content of the discharge plume from a submerged outfall is expected to cause at least partial melting of the sea ice from underneath. A surface discharge provides much less mixing with ambient water before the effluent spreads along tidal cracks and underneath the sea ice. The submerged discharge is expected to confine settleable wastewater solids to a benthic area near the outfall, but a surface discharge allows solids to settle over a wider area. (Auth.)

46-3314
Depositional environment in and paleoglacial setting around Marian Cove, King George Island, Antarctica.
Hong, S.M., et al, *Korean journal of polar research*, Dec. 1991, 2(2), p.73-85, In Korean with English summary. Refs. p.83-85.
Glacial deposits, Paleoclimatology, Glacier oscillation, Antarctica—Marian Cove.
Core sediments of Marian Cove are classified into 3 sedimentary facies: waterlain till of the lower part, accumulated just below the grounding line; interlaminated ice-proximal deposits of the middle part, formed by the combination of underwater flow and iceberg dumping; and compound glacial-marine sediments of the upper part, deposited at a sedimentary environment similar to the present. These facies, toward the top, are characterized by the sequence of depositional events formed by a retreating tidewater glacier with decreasing accumulation rate. The combined analysis of core facies and seismic profile suggests that the glaciers around Maxwell Bay and Marian Cove fluctuated with the climatic changes in Antarctica after the Wisconsin glacial period. Grounded glaciers extended to the central basin of Maxwell Bay during Wisconsin glacial period, as grounded glaciers began to retreat about 15,000-14,000 y a., the central basin of Maxwell Bay became covered by postglacial sediments with an average sedimentation rate of 200- 214 cm/1,000 yr. The glacier of Marian Cove, which retreated at least to the present position in the early Holocene, readvanced with minor climatic cooling in the beginning of the Late Holocene. (Auth. mod.)

46-3315
Cryospheric products from the DMSP-SSM/I.
Barry, R.G., *Glaciological data*, Jan. 1992, GD-24, p.1-3, 4 refs.
Sea ice distribution, Ice surveys, Radiometry, Data processing, Remote sensing, Microwaves, Spaceborne photography.

46-3316
Passive microwave data for snow cover studies at NSIDC.
Armstrong, R.L., *Glaciological data*, Jan. 1992, GD-24, p.5-9, 26 refs.
Snow cover distribution, Snow surveys, Radiometry, Data processing, Remote sensing, Microwaves, Spaceborne photography.

46-3317
Artificial intelligence applications of arctic passive microwave data.
Key, J.R., *Glaciological data*, Jan. 1992, GD-24, p.11-14, 4 refs.
Radiometry, Data processing, Sea ice distribution, Remote sensing, Microwaves.

46-3318
Passive microwave data for climate interactions studies.
Maslanik, J.A., *Glaciological data*, Jan. 1992, GD-24, p.15-18, 11 refs.
Sea ice distribution, Ice surveys, Radiometry, Air ice water interaction, Data processing, Remote sensing, Spaceborne photography.

46-3319
Application of passive microwave satellite data in arctic climate research.
Steffen, K., et al, *Glaciological data*, Jan. 1992, GD-24, p.19-28, 21 refs.
Schweiger, A.J.
Sea ice distribution, Ice surveys, Air ice water interaction, Radiometry, Data processing, Microwaves, Spaceborne photography.

46-3320
Passive microwave bibliography.
Brennan, A.M., ed, *Glaciological data*, Jan. 1992, GD-24, p.29-138, Author listing p.87-138.
Remote sensing, Radiometry, Bibliographies, Microwaves, Sea ice distribution, Ice surveys, Snow surveys, Spaceborne photography, Air ice water interaction, Data processing.

46-3321
Electric charge separation during the fragmentation of rime in an airflow.
Jayaratne, E.R., et al, *Journal of the atmospheric sciences*, Dec. 1, 1991, 48(23), p.2492-2495, 9 refs.
Griggs, D.J.
Icing, Cloud electrification, Ice electrical properties, Snow pellets, Charge transfer, Ice crystal collision, Ice air interface.

46-3322
Road and airport pavement response monitoring systems.
Janoo, V.C., ed, MP 3070, New York, American Society of Civil Engineers, 1992, 429p., Refs. passim.
Proceedings of a conference sponsored by the U.S. Army Cold Regions Research and Engineering Laboratory, West Lebanon, NH, Sep. 12-16, 1991. For selected papers see 46-3323 through 46-3330.
Eaton, R.A., ed.
Pavements, Soil trafficability, Ground thawing, Frost resistance, Thaw weakening, Seasonal freeze thaw, Strain measuring instruments.

46-3323
Instrumentation for vehicle mobility testing in the Frost Effects Research Facility.
Berliner, E., et al, MP 3071, Road and airport pavement response monitoring systems. Edited by V.C. Janoo and R.A. Eaton, New York, American Society of Civil Engineers, 1992, p.12-26, 4 refs.
Shoop, S.A.
Ground thawing, Soil trafficability, Traction, Frost penetration, Thaw depth, Laboratories, Measuring instruments, Test equipment.
Vehicle mobility in thawing soils is currently being studied in the Cold Regions Research and Engineering Laboratory's (CRREL) Frost Effects Research Facility (FERF). The instrumentation used to accomplish this can be divided into two classes. One set of instruments is devoted solely to determination of soil conditions and is imbedded in the test surface. This set consists of thermistors for determining depth of freeze, and tensiometers for determining moisture content. The remainder of the instruments are mounted on the vehicle and are used to measure speed, force, and temperature. The CRREL instrumented vehicle (*CIV*) is equipped with a fifth wheel and ultrasonic speed sensor for measuring vehicle speed, and proximity gauges and counters for measuring individual wheel speeds. The forces at the interface between the tire and the ground are measured by triaxial load cells. These load cells sense longitudinal (direction of travel), transverse (perpendicular to direction of travel), and vertical forces on the tire. Vehicle temperature is measured using thermocouples.

46-3324
Instrumentation for characterizing seasonal change in properties of pavement structures.
Haupt, R.S., et al, MP 3072, Road and airport pavement response monitoring systems. Edited by V.C. Janoo and R.A. Eaton, New York, American Society of Civil Engineers, 1992, p.125-137, 6 refs.
Bull, D.C.
Ground thawing, Thaw weakening, Soil trafficability, Pavements, Measuring instruments, Seasonal freeze thaw.
Pavement analysis techniques have been unable to effectively predict and account for variations in the in situ properties of pavement structures as their relative strengths adjust to seasonal changes in moisture and temperature. A joint research project between the Vermont Agency of Transportation (VAOT) and the U.S. Army Cold Regions Research & Engineering Laboratory (CRREL) has been initiated to evaluate in situ variations in the moduli of representative pavement layers as their structural properties are influenced by seasonal changes. Seven tests at five locations representing diversified examples of pavement sections and conditions are being instrumented to measure variations in support strength characteristics resulting from seasonal changes in weather, moisture and temperature. The objective of this paper is to present examples of prior and future instrumentation that has been investigated in an attempt to obtain the information necessary for effective evaluation of support characteristics that are needed for optimizing pavement design procedures.

46-3325
Thaw weakening research at the Minnesota Road Research Project.
Hovan, M.J., et al, Road and airport pavement response monitoring systems. Edited by V.C. Janoo and R.A. Eaton, New York, American Society of Civil Engineers, 1992, p.138-152, 1 ref.
Newcomb, D.E.
Ground thawing, Thaw weakening, Soil trafficability, Pavements.

46-3326
Installation and monitoring of thermal conductivity suction sensors in a fine-grained subgrade soil subjected to seasonal frost.
Khogali, W.E.I., et al, Road and airport pavement response monitoring systems. Edited by V.C. Janoo and R.A. Eaton, New York, American Society of Civil Engineers, 1992, p.153-167, 10 refs.
Anderson, K.O., Gan, J.K., Fredlund, D.G.
Subgrade soils, Pavements, Frost resistance, Seasonal freeze thaw, Soil trafficability, Soil freezing.

46-3327
Evaluation of soil water sensors in frozen soils.
Nieber, J.L., et al, Road and airport pavement response monitoring systems. Edited by V.C. Janoo and R.A. Eaton, New York, American Society of Civil Engineers, 1992, p.168-181, 18 refs.
Baker, J.M., Spaans, E.J.A.
Frozen ground thermodynamics, Soil water, Moisture meters, Unfrozen water content, Soil freezing, Moisture detection, Analysis (mathematics).

46-3328
Seasonal monitoring of pavements—a whole lot more.
Richter, C.A., Road and airport pavement response monitoring systems. Edited by V.C. Janoo and R.A. Eaton, New York, American Society of Civil Engineers, 1992, p.182-195, 6 refs.
Pavements, Seasonal freeze thaw, Frost resistance, Road maintenance.

46-3329
Measurement of shock pressure from FWD on a concrete pavement by impedance-matched shock gauge.
Dutta, P.K., et al, MP 3073, Road and airport pavement response monitoring systems. Edited by V.C. Janoo and R.A. Eaton, New York, American Society of Civil Engineers, 1992, p.213-228, 7 refs.
Kalafut, J.
Concrete pavements, Strain measuring instruments, Soil strength, Concrete strength, Impact tests, Shock waves.
This paper summarizes the installation, acquisition, and analysis of data from impedance-matched shock gauges developed at CRREL and installed in the Frost Effects Research Facility experimental pavement. The gauges were made with shock sensitive piezopolymer sensors embedded in specially formulated materials to match the shock impedance of concrete and soils in which they were installed. Measured data were compared with the values predicted from Boussinesq's solution for concentrated load modified for uniformly distributed circular load. Results from the numerical analysis using the computer code JULEA were also compared. Measured data are in greater agreement (within 15%) with the results predicted from the numerical analysis than with the modified Boussinesq solution. The shock gauges continued to function over a period of three months without any degradation.

46-3330
Strain and stress measurements in pavements.
Huhtala, M., et al, Road and airport pavement response monitoring systems. Edited by V.C. Janoo and R.A. Eaton, New York, American Society of Civil Engineers, 1992, p.229-243, 15 refs.
Pihlajamäki, J.
Pavements, Soil strength, Strain measuring instruments, Strain tests, Frost resistance.

46-3331
Glacial deposits in Great Britain and Ireland.
Ehlers, J., ed, Rotterdam, A.A. Balkema, 1991, 580p., Refs. p.503-542. For selected papers see 46-3332 through 46-3342.
Gibbard, P.L., ed, Rose, J., ed.
Glacial deposits, Glaciation, Glacial geology, Paleoclimatology, Stratigraphy, Geochronology, Pleistocene, Marine deposits, Quaternary deposits, United Kingdom.

46-3332
Time and space in the glacial sediment systems of the British Isles.
Bowen, D.Q., Glacial deposits in Great Britain and Ireland. Edited by J. Ehlers, P.L. Gibbard, and J. Rose, Rotterdam, A.A. Balkema, 1991, p.3-11.
Glacial deposits, Glaciation, Glacial geology, Stratigraphy, Paleoclimatology, Geochronology, United Kingdom.

46-3333
Mapping glacial deposits in Britain and Ireland.
Warren, W.P., et al, Glacial deposits in Great Britain and Ireland. Edited by J. Ehlers, P.L. Gibbard, and J. Rose, Rotterdam, A.A. Balkema, 1991, p.379-387.
Horton, A.
Glacial deposits, Geological maps, Geological surveys, Soil mapping, Quaternary deposits, United Kingdom.

46-3334
Geotechnical properties of glacial deposits in lowland Britain.
Paul, M.A., et al, Glacial deposits in Great Britain and Ireland. Edited by J. Ehlers, P.L. Gibbard, and J. Rose, Rotterdam, A.A. Balkema, 1991, p.389-404.
Little, J.A.
Glacial deposits, Soil surveys, Soil strength, Soil texture, Soil composition, Water content.

46-3335
Styles of Anglian ice-marginal channel sedimentation: as revealed by a conductivity meter and extendable augers.
Mathers, S.J., et al, Glacial deposits in Great Britain and Ireland. Edited by J. Ehlers, P.L. Gibbard, and J. Rose, Rotterdam, A.A. Balkema, 1991, p.405-414.
Zalasiewicz, G.P., Wealthall, G.P.
Glacial deposits, Soil surveys, Subglacial drainage, Outwash, Electromagnetic prospecting, Sedimentation.

46-3336
Till lithology in Ireland.
Warren, W.P., Glacial deposits in Great Britain and Ireland. Edited by J. Ehlers, P.L. Gibbard, and J. Rose, Rotterdam, A.A. Balkema, 1991, p.415-420.
Glacial deposits, Lithology, Geological surveys, Soil surveys.

46-3337
Distribution and stratigraphy of drumlins in Ireland.
McCabe, A.M., Glacial deposits in Great Britain and Ireland. Edited by J. Ehlers, P.L. Gibbard, and J. Rose, Rotterdam, A.A. Balkema, 1991, p.421-435.
Glacial deposits, Glacial geology, Stratigraphy, Geological surveys, Geomorphology.

46-3338
Sedimentology of glaciofluvial deposits.
Bryant, I.D., Glacial deposits in Great Britain and Ireland. Edited by J. Ehlers, P.L. Gibbard, and J. Rose, Rotterdam, A.A. Balkema, 1991, p.437-442.
Glacial deposits, Glacial rivers, Sedimentation, Outwash, Glacial geology.

46-3339
Glaciofluvial landforms.
Gray, J.M., Glacial deposits in Great Britain and Ireland. Edited by J. Ehlers, P.L. Gibbard, and J. Rose, Rotterdam, A.A. Balkema, 1991, p.443-454.
Glacial deposits, Glacial geology, Outwash, Glacial rivers, Landforms, Geomorphology.

46-3340
Deformation structures in British Pleistocene sediments.
Allen, P., Glacial deposits in Great Britain and Ireland. Edited by J. Ehlers, P.L. Gibbard, and J. Rose, Rotterdam, A.A. Balkema, 1991, p.455-469.
Glacial deposits, Glacial geology, Tectonics, Quaternary deposits, Pleistocene, Geomorphology.

46-3341
Geochemical properties of glacial deposits in the British Isles.
Burek, C.V., et al, Glacial deposits in Great Britain and Ireland. Edited by J. Ehlers, P.L. Gibbard, and J. Rose, Rotterdam, A.A. Balkema, 1991, p.471-491.
Cubitt, J.M.
Glacial deposits, Weathering, Geochemistry, Glacial geology, Quaternary deposits, Soil chemistry.

46-3342
Glacial deposits of Britain and Europe: general overview.
Ehlers, J., et al, Glacial deposits in Great Britain and Ireland. Edited by J. Ehlers, P.L. Gibbard, and J. Rose, Rotterdam, A.A. Balkema, 1991, p.493-501.
Gibbard, P.L., Rose, J.
Glacial deposits, Glacial geology, Glaciation, Pleistocene, Quaternary deposits, Stratigraphy.

46-3343
Excess electrons in polar matrices.
Ogasawara, M., Excess electrons in dielectric media. Edited by C. Ferradini and J.P. Jay-Gerin, Boca Raton, FL, CRC Press, Inc., 1991, p.287-314, 150 refs.
DLC QC585.E92 1991
Clathrates, Ice electrical properties, Ice physics, Ionization, Ice microstructure, Frozen liquids, Radiation absorption, Low temperature research.

46-3344
Most beautiful polar low. A case study of a polar low development in the Bear Island region.
Nordeng, T.E., et al, *Tellus*, Mar. 1992, 44A(2), Polar Meteorology Symposium, Copenhagen, Denmark, Apr. 1990. Selected papers, p.81-99, 33 refs.
Rasmussen, E.A.
Polar atmospheres, Atmospheric pressure, Atmospheric disturbances, Atmospheric circulation, Spaceborne photography, Marine meteorology, Latent heat, Mathematical models, Synoptic meteorology.

46-3345
Cold air outbreak over the Norwegian Sea observed with the TIROS-N Operational Vertical Sounder (TOVS) and the Special Sensor Microwave/Imager (SSM/I).
Claud, C., et al, *Tellus*, Mar. 1992, 44A(2), Polar Meteorology Symposium, Copenhagen, Denmark, Apr. 1990. Selected papers, p.100-118, 20 refs.
Marine meteorology, Polar atmospheres, Atmospheric disturbances, Remote sensing, Sounding, Detection, Meteorological data, Fronts (meteorology), Weather forecasting.

46-3346
Comparison of satellite sounding data and aircraft measurements within a mature polar low.
Turner, J., et al, *Tellus*, Mar. 1992, 44A(2), Polar Meteorology Symposium, Copenhagen, Denmark, Apr. 1990. Selected papers, p.119-132, 19 refs.
Lachlan-Cope, T.A., Moore, J.C.
Marine meteorology, Polar atmospheres, Atmospheric disturbances, Air temperature, Sounding, Remote sensing, Radiance, Fronts (meteorology), Correlation.

46-3347
Polar lows and arctic instability lows in the Bear Island region.
Rasmussen, E.A., et al, *Tellus*, Mar. 1992, 44A(2), Polar Meteorology Symposium, Copenhagen, Denmark, Apr. 1990. Selected papers, p.133-154, 24 refs.
Pedersen, T.S., Pedersen, L.T., Turner, J.
Marine meteorology, Polar atmospheres, Atmospheric disturbances, Atmospheric circulation, Fronts (meteorology), Stability, Meteorological factors, Convection, Ice cover effect.

46-3348
Polar lows affecting Denmark.
Aakjaer, P.D., *Tellus*, Mar. 1992, 44A(2), Polar Meteorology Symposium, Copenhagen, Denmark, Apr. 1990. Selected papers, p.155-172, 19 refs.
Marine meteorology, Atmospheric circulation, Atmospheric disturbances, Fronts (meteorology), Climatology, Classifications, Meteorological data.

46-3349
Antarctic mesocycle regimes from satellite and conventional data.
Fitch, M., et al, *Tellus*, Mar. 1992, 44A(2), Polar Meteorology Symposium, Copenhagen, Denmark, Apr. 1990. Selected papers, p.180-196, 42 refs.
Carleton, A.M.
Marine meteorology, Polar atmospheres, Atmospheric disturbances, Atmospheric circulation, Remote sensing, Ice cover effect, Wind factors, Synoptic meteorology, Antarctica—Ross Sea.
Mesocale vortices in the Antarctic poleward of 50S are examined in the synoptic context for the Ross Sea sector for transition and winter months of 1988, using DMSP (Defense Meteorological Satellite Program) thermal infrared (TIR) images. Mesoscale vortices are classified and tracked, and the dominant characteristics are defined and discussed. A "superposed epoch" (compositing) method using 1000 and 500 mb height data identifies the dominant synoptic regimes in which mesoscale vortices tend to develop. This analysis indicates that during active or outbreak periods, a negative thickness anomaly ("cold pool") is located northeast of the Ross Sea, and mesoscale vortices tend to occur on the poleward side of that anomaly. In addition, an enhanced trough-ridge pattern is evident for the Ross Sea sector compared with the composite pattern for inactive, or dearth, periods. The active periods of mesoscale vortices appear to originate from Antarctica, possibly via the persistent katabatic outflows from the ice sheet, rather than from teleconnections to lower latitudes. Analysis of Automatic Weather Station (AWS) data for the Ross Sea region supports this notion, at least for individual cases. Confirmation of these findings for the corresponding months of additional years is continuing. (Auth. mod.)

46-3350
Theoretical cooling coil calculations at freezer temperatures to avoid unfavorable coil-frost.
Smith, G.R., *American Society of Heating, Refrigerating and Air-Conditioning Engineers. Transactions*, 1989, 95(Pt 2), p.1138-1148, 5 refs.
DLC TH7201.H5
Freezers, Temperature control, Air temperature, Frost protection, Psychrometers, Surface temperature, Air conditioning, Analysis (mathematical), Performance.

46-3351
Pattern recognition of clouds and ice in polar regions.
Welch, R.M., et al, *SPIE—The International Society for Optical Engineering. Proceedings*, 1990, *Vol.1299, Long-term monitoring of the earth's radiation budget*. Edited by B.R. Barkstrom, p.128-138, 37 refs.
DLC QC809.E6L66 1990
Cloud cover, Classifications, Snow cover effect, Detection, Spaceborne photography, Radiometry, Resolution, Polar atmospheres, Data processing, Accuracy.

46-3352
Ice engineering design for marinas.
Wortley, C.A., World Marina '91 International Conference, 1st, Long Beach, CA, Sep. 4-8, 1991. Proceedings, New York, American Society of Civil Engineers, 1991, p.524-533, 4 refs.
DLC VK369.W67 1991
Lake ice, Docks, Ports, Ice loads, Cold weather operation, Design criteria, Countermeasures, Ice conditions, Freezeup, Ice breakup.

46-3353
Nearshore sediment transport by slush/brash ice in southern Lake Michigan.
Kempema, E.W., et al, Specialty Conference on Quantitative Approaches to Coastal Sediment Processes, Seattle, WA, June 25-27, 1991. Proceedings, Vol.1. Coastal sediments '91. Edited by N.C. Kraus et al, New York, American Society of Civil Engineers, 1991, p.212-219, 15 refs.
Reimnitz, E.
DLC GB450.2.S66 1991
Lake ice, Ice rafting, Ice rafting, Ice composition, Littoral zone, Sediments, Ice cover effect, Velocity measurement.

46-3354
Erosion and accretion along the arctic coast of Alaska: the influence of ice and climate.
Barnes, P.W., et al, Specialty Conference on Quantitative Approaches to Coastal Sediment Processes, Seattle, WA, June 25-27, 1991. Proceedings, Vol.2. Coastal sediments '91. Edited by N.C. Kraus et al, New York, American Society of Civil Engineers, 1991, p.1518-1531, 39 refs.
Rollyson, B.P.
DLC GB450.2.S66 1991
Shore erosion, Sea ice, Sediment transport, Ice scoring, Deltas, Climatic factors, Geomorphology.

46-3355
Forecasting irrigation water supply using a computer model and remotely sensed snow cover.
Miller, W., National Conference on Irrigation and Drainage Engineering, Honolulu, HI, July 22-26, 1991. Proceedings. Irrigation and Drainage. Edited by W.F. Ritter, New York, American Society of Civil *Engineers, 1991, p.787-793, 8 refs.*
DLC TC823.I75 1991
Irrigation, Water supply, Runoff forecasting, Snow cover distribution, Remote sensing, Computerized simulation, Snowmelt, Agriculture, Surface waters.

46-3356
***Numerical experiments on convergence cloud bands* over the northern part of the Japan Sea.**
Sasaki, H., et al, *Meteorological Society of Japan. Journal*, June 1991, 69(3), p.375-388, With Japanese summary. 18 refs.
Satomura, T.
Cloud physics, Marine meteorology, Snowstorms, Air masses, Atmospheric circulation, Japan, Sea.

46-3357
Further numerical study on the formation of the convergent cloud band over the Japan Sea in winter.
Nagata, M., *Meteorological Society of Japan. Journal*, June 1991, 69(3), p.419-428, With Japanese summary. 18 refs.
Cloud physics, Marine meteorology, Snowstorms, Air masses, Atmospheric circulation, Japan, Sea.

46-3358
***Lake Ontario Winter Storms* (LOWS) project.**
Reinking, R.F., et al, *U.S. National Oceanic and Atmospheric Administration. Environmental Research Laboratories. Wave Propagation Laboratory. Technical memorandum*, 1991, ERL WPL-216, 147p., 71 refs.
Lake effects, Snowstorms, Ice storms, Weather forecasting, Ontario, Lake.

46-3359
Backscattering lidar system at Terra Nova Bay.
Castagnoli, F., et al, International Laser Radar Conference. Conference abstracts, [1988], p.206-208, 3 refs.
Electronic equipment, Lidar, Backscattering, Antarctica—Terra Nova Bay.
An elastic backscattering lidar is described. The system has been designed to operate in Antarctica under the Italian National Program for Antarctic Research. The system has collected data on meteorological and atmospheric parameters. The evaluations of these parameters are made in other papers presented at this conference. The system is composed of a Nd-Yag laser source, a newtonian telescope, two receiving channels and acquisition and presentation equipment controlled by a personal computer. All of the system is housed in a container, some technical and mechanical solutions have been adopted to solve environmental problems. (Auth.)

46-3360
Submarine combat in the ice.
Lyon, W.K., *U.S. Naval Institute. Proceedings*, Feb. 1992, 118(2/1,068), p.33-40, 5 refs.
Military operation, Sea ice, Ice bottom surface, Ice mechanics.

46-3361
Quarrying in Antarctica: Australian territory's rebuilding programme.
Hoffmann, G., *Quarry management*, Jan. 1992, p.13-18.
Quarries, Cold weather construction, Buildings, *Antarctica—Mawson Station, Antarctica—Casey Station.*
Quarrying at Mawson and Casey Stations is briefly reviewed as it pertains to the antarctic rebuilding program. The rock derived is used for roads and other aspects of station reconstruction. Advantages and disadvantages of the rock and its location near the stations are discussed and the efficiencies of the drilling equipment and vehicles used in the various quarrying phases are noted. Effects of the operation, such as dust problems downwind of the site, disruptions of petrel nesting sites, and noise from blasting, are shown, and alleviating actions taken are described.

46-3362
Architecture in extremity: determining influences on antarctic architecture.
Incoll, P.G., Conference on Architecture in Isolation, [1991], 16p., 20 refs.
Cold weather construction, Buildings, Environments, Design criteria.
In 1976 a program was commenced to completely rebuild Australia's three continental antarctic stations: Mawson, Davis and Casey. By 1990 this program was almost complete at Casey, slightly less so at Davis and about 60% complete at Mawson. The work provides the basis for this paper. It is relevant to this conference on "Architecture in Isolation" because Antarctica is at one of the extremities of isolation available on this planet. One of the themes of discussion at the conference is the relative effect of two different influences on architecture—those derived from the locality of the site, and those derived from the world away from the site. These themes can be seen quite clearly in operation in Antarctica, and the value of the extreme nature of the locality for our purposes is that it makes their operation easier to see and discuss than at other less extreme places.

46-3363
Modular buildings for Antarctica.
Charrett, D.E., et al, First National Structural Engineering Conference, 1987, [1987], 9p., 4 refs.
Incoll, P.G., Kozlovsky, N.
Buildings, Modular construction.
The paper provides a review of the Australian philosophy on what antarctic buildings should contain, how they should be constructed, and what strength standards should be adhered to. The buildings should be efficient, steel braced, have replaceable external cladding, have standard prefabricated components, need minimum on-site labor, should minimize snow drift problems, incorporate fire safety devices, and be trial erected before being packed for shipping. Shipping containers have sufficient strength to withstand, with minimum damage, the effects of rough seas and rough handling. Buildings are standardized in dimensions and architectural details such as floors, walls, doors, partitions, insulation, service openings, vapor seals, and closed gaps at joints. Advantages and disadvantages of the modular concept are noted.

46-3364
On the formation and sedimentation of stratospheric nitric acid aerosols: implications for polar ozone destruction.
Arnold, F., et al, *Geophysical research letters*, Apr. 3, 1992, 19(7), p.677-680, 16 refs.
Petzoldt, K, Reimer, E.
Aerosols, Ozone, Chemical composition, Stratosphere.

46-3365
Development and low temperature test of the output controller of the wind turbine system for Antarctica.
Kimura, S., et al, *Wind engineering*, 1991, 15(4), p.176-186, 6 refs.
Ishizawa, K., Suzuki, K.
Wind power generation, Electricity, Low temperature tests, Equipment.
The output controller as the main component of a wind turbine system for producing electricity at an observation camp in Antarctica was developed and tested in a simulated low temperature environment. The introduction of a load system provided through a set of batteries, a snow thawer and a dummy load, was made. The test was carried out in order to verify proper functioning of the controller at low temperatures corresponding to those in Antarctica. The test results show that it would work as designed. (Auth.)

46-3366
***Remote sensing over oceans of optically thin cirrus* and its significance.**
Cuddapah, P., et al, *SPIE—The International Society for Optical Engineering. Proceedings*, 1990, Vol.1299, Long-term monitoring of the earth's radiation budget. Edited by B.R. Barkstrom, p.154-173, 16 refs.
Yoo, J.M.
DLC QC809.E6L66 1990
Cloud cover, Remote sensing, Radiation balance, Ice crystal optics, Infrared spectroscopy, Polar atmospheres, Spectra, Scattering, Ozone.
From spectral data obtained by the Infrared Interferometer Spectrometer (IRIS) flown on the Nimbus 4 satellite in 1970, the extinction characteristics of thin ice crystal clouds over the oceanic convective rain belts in the tropics and midlatitudes were examined. The optical depth of these clouds in the IR window region is < 3 and their spectral features are consistent with cloud particle size of approx. 10 microns. These optically thin ice crystal clouds are extensions of the anvil clouds generated by deep convective systems. The IRIS data also indicate the existence of optically thin ice clouds that extend from the upper troposphere into the lower stratosphere in the polar regions during winter and early spring. Radiative transfer calculations suggest that the equivalent ice water content of these polar clouds is of the order of 1 to 2 milligram per sq cm. It is suggested that the 'ozone hole' in the region of the Weddell Sea is linked, at least in part, to these ice crystal clouds. (Auth. mod.)

46-3367
Summary TIR for the Soldier Enhancement Program (SEP) test of the Lightweight Personnel Armor System for Ground Troops (PASGT) helmet.
Weant, J.H., et al, *U.S. Army Test and Evaluation Command. Cold Regions Test Center. Report*, Apr. 1992, TECOM Project No.8-EI-525-PAS-003, 5p. + appends.
Johnson, M.C.
Clothing, Military equipment, Cold weather performance.

46-3368
Stratigraphy and paleoecology of the Eocene *Stellarima* Assemblage Zone (pyrite diatom steinkerns) in the Beaufort-Mackenzie Basin, arctic Canada.
McNeil, D.H., *Bulletin of Canadian petroleum geology*, Mar. 1990, 38(1), p.17-27, With French summary. 41 refs.
Marine deposits, Bottom sediment, Paleoecology, Stratigraphy, Sea level, Exploration, Fossils, Upwelling, Crude oil, Beaufort Sea.

46-3369
Hydraulic/geomorphic relationships in a braided to meandering transition.
Neill, C.R., et al, MP 3074, XXIV IAHR Congress, Madrid, Sep. 9-13, 1991, Madrid, International Association for Hydraulic Research, 1991, p.A/139-A/147, 9 refs.
Collins, C.M.
River flow, Sediment transport, Channels (waterways), Flood control, Hydraulics, United States—Alaska—Tanana River.

46-3370
Skiing: the shortest path is not the fastest. [Ski: le chemin le plus court n'est pas le plus rapide],
Reinisch, G., *La recherche*, Mar. 1992, Vol.23, p.356-357, In French. 4 refs.
Skis, Snow surface.

46-3371
Topography, wear, and sliding functions of skis.
Mathia, T.G., et al, *International journal of machine tools manufacture*, 1992, 32(1/2), p.263-266, 14 refs.
Zahouani, H., Midol, A.
Skis, Plastics snow friction, Mathematical models.

46-3372
Similitude requirements of snowdrift modelling for antarctic environment.
Kim, D.H., et al, *University of Sydney, Australia. School of Civil and Mining Engineering. Research report*, Feb. 1991, R-634, 69p., PB92-104157, Refs. p.28-32.
Kwok, K.C.S., Rohde, H.F.
Snowdrifts, Blowing snow, Snow loads, Wind factors, Wind pressure, Wind tunnels, Environment simulation, Mathematical models, Turbulent boundary layer.
A closed-circuit turbulent boundary layer Snowdrift Wind Tunnel was built at the University of Sydney for the study of antarctic snow drifting. Scaled turbulent boundary layer winds, *representing prototype summer and winter conditions* (coastal sites of the Australian Antarctic Territory), were generated. Sodium bicarbonate was chosen as model snow. The results of snowdrift simulation using the model snow were compared with field measurements. Similitude parameters included flow and geometry, angle of repose, particle trajectory and time scale. The similitude requirement of scaled turbulent boundary layer wind is considered one of the most important modeling requirements. (Auth. mod.)

46-3373
Delineation of sedimentary basins using seismic techniques on Canada's arctic continental margin.
Forsyth, D.A., et al, Potential of deep seismic profiling for hydrocarbon exploration, Paris, Éditions Technip, 1990, p.225-236, 35 refs.
Bottom sediment, Ocean bottom, Seismic surveys, Exploration, Earth crust, Tectonics, Ice islands, Marine geology, Canada.

46-3374
Effectiveness of different shooting techniques in antarctic firn.
King, E.C., et al, *First break*, June 1991, 9(6), p.281-288, 10 refs.
Jarvis, E.P.
Firn, Seismic surveys, Ice shelves, Explosives.
In Jan. and Feb. 1989 the British Antarctic Survey conducted experiments on seismic reflection shooting in the firn of the Larsen Ice Shelf. *Twin Otter light aircraft were used to deploy* field parties. Pentaerythritol-tetranitrate (PETN) and ammonium nitrate and fuel oil (ANFO) were used as explosives. The results and storage capabilities under cold conditions were the same for PETN and ANFO, but ANFO is cheaper. The results of the experiments are compared with results found in the literature from the Ronne Ice Shelf, the Ross Ice Shelf, and East Antarctica.

46-3375
MINSALT: Reduction of the salted road network in Kopparberg county. [MINSALT: Reducering av saltvägnätet i Kopparbergs län],
Möller, S., *Sweden. Statens väg- och trafikinstitut. VTI meddelande*, 1991, No.638, 95p., In Swedish with English summary. 11 refs.
Salting, Road maintenance, Sanding, Road icing, Safety.

46-3376
Icebreaker midbody resistance phase III.
Baker, D.N., et al, *Transport Canada. Publication*, Dec. 1991, TP 11198E, 44p. + appends., With French summary. 9 refs.
Orendorff, T., Hartleib, J.
Icebreakers, Ice breaking, Ice loads, Ice navigation, Ice cover strength, Computer programs, Mathematical models.

46-3377
Abbreviated test report for the technical feasibility test of the Lightweight Extreme Weather Shelter (LEWS).
San Giorgio, D., *U.S. Army Test and Evaluation Command. Cold Regions Test Center. Report*, Apr. 1992, USATECOM Proj No.8-ES-975-LEW-003, 21p. + appends.
Portable shelters, Military equipment, Snow loads, Cold weather tests.

46-3378
Progress report on analysis of differential attenuation radar data obtained during WISP-91.
Martner, B.E., et al, *U.S. National Oceanic and Atmospheric Administration. Environmental Research Laboratories. Wave Propagation Laboratory. NOAA technical memorandum*, Oct. 1991, ERL WPL-215, 43p., PB92-133800, 13 refs.
Kropfli, R.A., Ash, L.E., Snider, J.B.
Aircraft icing, Ice forecasting, Radar echoes, Radiometry, Supercooled clouds, Unfrozen water content, Atmospheric attenuation, Data processing.

46-3379
Static and cyclic tests on composite ice-resisting walls; the second test programme.
Gowda, S.S., et al, *Finland. Technical Research Centre. Research notes*, Mar. 1991, No.1229, 118p. + appends., PB92-138965, With Finnish summary. 51 refs.
Hassinen, P., Juntunen, J., Erikoinen, O.
Ice loads, Offshore structures, Ice control, Walls, Concrete structures, Steel structures, Strain tests, Mathematical models, Ice solid interface.

46-3380
Oil and gas assessment of the Utukok Special Management Area, National Petroleum Reserve in Alaska.
Bascle, R.J., et al, *U.S. Bureau of Land Management. Alaska State Office. BLM-Alaska open file report*, Mar. 1992, No.41, 28p., 22 refs.
Foland, R.L.
Exploration, Crude oil, Natural gas, Geological surveys, Natural resources, Economic development, United States—Alaska—North Slope.

46-3381
Leasable mineral resource assessment of the South-central Planning Area, Alaska.
Diel, W.R., *U.S. Bureau of Land Management. Alaska State Office. BLM-Alaska open file report*, Dec. 1991, No.35, 68p., Refs. p.50-64.
Natural resources, Exploration, Geological surveys, Economic development, Crude oil, Natural gas, Coal, Geothermal prospecting, United States—Alaska.

46-3382
Three years of natural revegetation on the 1977 Bear Creek burn in interior Alaska.
Hanson, W., *U.S. Bureau of Land Management. Alaska State Office. BLM-Alaska open file report*, Mar. 1992, No.28, 43p., 48 refs.
Forest fires, Revegetation, Taiga, Forest tundra, United States—Alaska.

46-3383
Log analysis of Aurora 890-No.1, OCS-Y-0943 Well, offshore of the Arctic National Wildlife Refuge 1002 Area, northeast Alaska.
Banet, A.C., Jr., *U.S. Bureau of Land Management. Alaska State Office. BLM-Alaska technical report*, Mar. 1992, No.15, 37p., 24 refs.
Well logging, Exploration, Offshore drilling, Bottom sediment, Ocean bottom, Crude oil, Natural gas, United States—Alaska—Arctic National Wildlife Refuge.

46-3384
Determination of creep properties of frozen soils by means of the borehole dilatometer relaxation test.
Ladanyi, B., *Canada. Geological Survey. Open file*, 1991, No.2418, 87p. + appends., 23 refs.
Frozen ground strength, Soil creep, Permafrost samplers, Borehole instruments, Strain measuring instruments, Relaxation (mechanics), Analysis (mathematics).

46-3385
Acquisition of natural remanent magnetization for dirt-snow containing rock dust.
Funaki, M., et al, *Journal of geomagnetism and geoelectricity*, 1991, 43(10), p.803-811, 16 refs.
Sakai, H.
Impurities, Remanent magnetism, Firn, Depth hoar, Dust, Volcanic ash, Snow impurities.
Magnetization process of dirt-snow containing fine-grained magnetic minerals was investigated in order to understand the acquisition mechanism of natural remanent magnetization (NRM) by dirt-ice layers in Antarctica. Two types of NRM acquisition mechanisms in the geomagnetic field (GMF) are proposed: (1) magnetic grains align along the GMF when they drop onto the surfaces of underlying snow due to vaporization of snow; (2) the magnetic grains are rotated to align in the GMF direction on the snow surfaces by the torque with the GMF and the NRM. The compaction of the natural snow at formation of depth hoar works to flatten the NRM direction. Probably *the antarctic dirt-ice has acquired NRM during the periods of* accumulation of snow and magnetic grains and formation of the depth hoar. The NRM of dirt-snow and -ice are useful for understanding the glacial dynamics and paleomagnetism of the antarctic ice sheet. (Auth. mod.)

46-3386
No summer lay-ups with new icebreaking/support ship.
North, R., *Offshore*, Mar. 1992, 52(3), p.101-102.
Icebreakers, Ships, Pipe laying.

46-3387
On the frozen force between snow and ethylene tetrafluoride resin.
Kobayashi, S., et al, *Niigata. University. Research Institute for Hazards in Snowy Areas. Annual report,* 1990, No.12, p.1-6, 7 refs. For another source see 46-2246. For an earlier Japanese version see 43-3523.
Satow, K.
Snow loads, Ice adhesion, Roofs, Plastics snow friction, Resins, Snow removal.

46-3388
Characteristics of icing observed at the Höghetta ice dome in northern Spitsbergen.
Izumi, K., *Niigata. University. Research Institute for Hazards in Snowy Areas. Annual report,* 1990, No.12, p.7-13, 7 refs. For another source see 46-2207.
Icing, Ice accretion, Meteorological factors, Ice air interface, Glacial meteorology, Impurities, Norway—Spitsbergen.

46-3389
Geochemical study of ground water recharge and movement in Nagaoka area.
Sato, O., et al, *Niigata. University. Research Institute for Hazards in Snowy Areas. Annual report,* 1990, No.12, p.45-55, In Japanese with English summary. 17 refs.
Suzuki, K.
Ground water, Geochemistry, Soil pollution, Water chemistry, Water pollution, Fallout, Japan—Nagaoka.

46-3390
Meteorological data at Yamakoshi, Niigata Prefecture, during the winters of 1985-1986 and 1986-1987.
Izumi, K., et al, *Niigata. University. Research Institute for Hazards in Snowy Areas. Annual report,* 1990, No.12, p.79-92, In Japanese. 4 refs.
Kobayashi, S., Aoyama, K.
Meteorological data, Snow accumulation, Air temperature, Winter, Japan—Niigata Prefecture.

46-3391
***Fluctuations in the warming effect of oceans on global* climate.** [Kolebaniia otepliaiushchego vliianiia okeanov na global'nyĭ klimat],
Alekseev, G.V., et al, *Akademiia nauk SSSR. Doklady,* Sep.-Oct. 1991, 320(1), p.70-73, In Russian.
Podgornyĭ, I.A., Sviashchennikov, P.N.
Global change, Global warming, Oceans, Mathematical models, Water temperature, Climatic changes, Air water interactions, Air temperature.

46-3392
***Gotland,* a Finnish-built coastguard vessel for Sweden.**
Lenton, H.T., *Maritime defence,* Feb. 1991, 16(2), p.38.
Ships, Design, Specifications, Ice navigation.

46-3393
Small, multi-purpose, arctic patrol vessel.
Lenton, H.T., *Maritime defence,* Feb. 1991, 16(2), p.39.
Ships, Design, Specifications, Ice navigation.

46-3394
"Polar Circle," a high-spec replacement for "Endurance".
Lenton, H.T., *Maritime defence,* Nov. 1991, 16(11), p.357-358.
Icebreakers, Design, Specifications.

46-3395
Enhancement of photoyield associated with disruption of bonding during adsorbate sublimation.
Chakarov, D.V., et al, *Surface science letters,* Nov. 1991, 258(1-3), p.L691-L696, 21 refs.
Ho, W.
Ice physics, Ice sublimation, Hydrogen bonds, Decomposition, Radiation absorption, Surface properties, Spectra, Temperature effects.

46-3396
Cathodic protection for ice-going ships. *Motor ship,* Apr. 1989, 70(829), p.17-18.
Ships, Icebreakers, Corrosion, Countermeasures, Electric equipment, Design, Cold weather operation.

46-3397
Detection of hail on radar images.
Bukharov, M.V., *Soviet journal of remote sensing,* Feb. 1992, 9(4), p.652-664, Translated from Issledovanie Zemli iz kosmosa, 1991. 9 refs.
Hail clouds, Remote sensing, Radar photography, Detection, Scattering, Image processing, Side looking radar, Precipitation (meteorology).

46-3398
Space radar observation of the dynamics of the ice coast and the drift of icebergs in the Antarctic.
Krovotyntsev, V.A., et al, *Soviet journal of remote sensing,* Feb. 1992, 9(4), p.672-687, Translated from Issledovanie Zemli iz kosmosa, 1991. 16 refs.
Milekhin, O.E., Popov, V.I., Spiridonov, IU.G.
Spaceborne photography, Calving, Icebergs, Drift, Radar tracking, Side looking radar, Velocity measurement, Ice surveys.
Radar observations from oceanographic satellites are used to observe the dynamics of the ice coast of Antarctica and the breaking away of gigantic icebergs. The paper describes a digital radar map of Antarctica at 3 cm wavelength, generated in 1986. The trajectory of the drift of a gigantic iceberg in the Ross Sea is reconstructed for the period from 1988 to 1989. The paper considers the dynamics of the breaking away of three gigantic icebergs in the Weddell Sea in 1984-1990. The sizes of icebergs and the characteristics of their drift in summer and winter conditions are determined. (Auth.)

46-3399
Propagation velocity of electromagnetic waves in glaciers as an indicator of their hydrothermal state, structure and regime. [Skorost' rasprostraneniia elektromagnitnykh voln v lednikakh kak pokazatel' ikh gidrotermicheskogo sostoianiia, stroeniia i rezhima],
Vasilenko, E.V., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanĭ,* Oct. 1990, Vol.70, p.3-17, In Russian with English summary. 41 refs.
Macheret, IU.IA., Moskalevskiĭ, M.IU.
Glaciers, Electromagnetic properties, Water content, Velocity measurement, Hydrothermal processes.

46-3400
Factors and the natural system of alpine glaciation. [O faktorakh i prirodnoĭ sisteme gornogo oledeneniia],
Verkulich, S.R., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanĭ,* Oct. 1990, Vol.70, p.17-23, In Russian with English summary. 13 refs.
Moskalenko, I.G.
Alpine glaciation, Mountain glaciers, Climatic factors, Geomorphology, Geologic processes.

46-3401
Glacioclimatic characteristics of antarctic glaciers as a reflection of general planetary atmospheric processes. [Gliatsioklimaticheskie kharakteristiki antarkticheskikh lednikov—otrazhenie obshcheplanetarnykh atmosfernykh protsessov],
Zakharov, V.G., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanĭ,* Oct. 1990, Vol.70, p.23-29, In Russian with English summary. 25 refs.
Khmelevskaia, L.V.
Atmospheric circulation, Snow accumulation, Glacier oscillation.
The main features of the global circulation of the atmosphere are meridional and zonal forms of transfers. It is noteworthy that the interrelations between their duration are not permanent and respond to climatic fluctuations. This relationship also changes throughout the year, especially in spring and in autumn during transitional periods of the rearrangement of the baric field of the Earth. This is mainly caused by the abrupt change of the polar night by the polar day, seasonal changes of the underlying surface, the growth of temperature contrasts and some other factors. Considerable temperature contrasts contribute to the development of active meridional transfers, in the course of which the synchronism of the atmospheric circulation of the Northern and Southern Hemispheres is pronounced. Analysis of the perennial changes in the duration of spring and pre-winter circulation seasons of the Northern Hemisphere and long-term changes in the antarctic glacier fluctuations and snow accumulation in Central Antarctica have shown that a certain relationship exists between the two latter properties. This relationship is based on the dependence of the disintegration of the floating part of Antarctica on the rate of cyclonic activity. Interpretation of the data has shown that in 1881-1970 the long-term changes in the duration of spring and pre-winter circulation seasons of the Northern Hemisphere and the changes in glacioclimatic indices of Antarctica were synchronous and reflected the global nature of seasonal atmospheric processes of the transitional periods. (Auth. mod.)

46-3402
Characteristics of the structure and ice formation conditions in a firn pack on the Austfonna, Nordaustlandet. [Osobennosti stroeniia i uslovii l'doobrazovaniia v firnovoĭ tolshche Vostochnogo ledianogo polia na Severo-Vostochnoĭ Zemle],
Sin'kevich, S.A., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanĭ,* Oct. 1990, Vol.70, p.29-36, In Russian with English summary. 12 refs.
Firn stratification, Ice formation, Ice structure.

46-3403
Hydrothermal regime and ice formation in the central part of the Akademiya Nauk Glacier, Severnaya Zemlya. [Gidrotermicheskiĭ rezhim i l'doobrazovanie v tsentral'noĭ chasti lednika Akademii Nauk na Severnoĭ Zemle],
Zagorodnov, V.S., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanĭ,* Oct. 1990, Vol.70, p.36-43, In Russian with English summary. 18 refs.
Glacial hydrology, Ice formation, Hydrothermal processes, Snow accumulation, Firn stratification.

46-3404
Cryogenic structure of loose sediments in Spitsbergen. [Kriogennoe stroenie rykhlykh otlozhenĭ Shpitsbergena],
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Mass transfer, Glacier thickness, Glacier tongues, Ice formation, Glacier melting, Glacier oscillation, Glacier mass balance.

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46-3415
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Snow surface, Surface roughness, Diurnal variations, USSR—Severnaya Zemlya.
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Ice cores, Ice composition, Boreholes.

46-3417
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46-3418
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Snow cover, Snow density, Porosity, Atmospheric pressure, Thermodynamics.

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46-3421
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46-3422
Recent tendencies and problems in the development of geo-information systems, and their role in International Geosphere-Biosphere Program studies. [Sovremennye tendentsii i problemy razvitiia geoinformatsionnykh sistem, ikh rol' v issledovaniiakh po Mezhdunarodnoi geosferno-biosfernoi programme],
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46-3423
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46-3424
Using satellite data in geo-information systems. [Ispol'zovanie aerokosmicheskoi informatsii v geoinformatsionnykh sistemakh],
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46-3425
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Snow cover, Data processing, Computer programs, Computer applications.

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46-3430
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46-3431
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Snow cover distribution, Snow cover stability, Data processing, Computer programs, Computer applications, Analysis (mathematics), Statistical analysis.

46-3432
Prospects for the development of the local glaciological GIS for the Dzhankuat Glacier. [Perspektivy sozdaniia gliatsiologicheskoi GIS lokal'nogo urovnia dlia lednika Dzhankuat],
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46-3433
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46-3437
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46-3438
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46-3439
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Joint Committee on Antarctic Research. [V Mezhduvedomstvennoĭ komissii po izucheniiu Antarktiki],
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Meetings, Research projects, Antarctica.
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46-3441
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46-3444
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46-3447
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46-3448
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46-3449
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46-3454
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46-3455
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46-3456
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46-3458
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46-3459
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46-3461
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Olesen, O.B.
Glacial hydrology, Glacier surveys, Subglacial drainage, Meltwater, Electric power, Hydraulics, Greenland.

46-3462
Change in the status of the Greenland Inland Ice.
Weidick, A., *Grönlands geologiske undersögelse. Rapport*, 1991, No.152, p.39-41, 8 refs.
Glacier surveys, Glacier oscillation, Greenland.

46-3463
Economic mineral resources: activities in 1990.
Schönwandt, H.K., *Grönlands geologiske undersögelse. Rapport*, 1991, No.152, p.41-46, 15 refs.
Exploration, Minerals, Natural resources, Gold, Economic development, Greenland.

46-3464
Black Angel lead-zinc mine 1973-90.
Thomassen, B., *Grönlands geologiske undersögelse. Rapport*, 1991, No.152, p.46-50, 14 refs.
Mining, Minerals, Economic development, Exploration, Natural resources, Greenland.

46-3465
Ornamental stones in west and south Greenland.
Garde, A.A., et al, *Grönlands geologiske undersögelse. Rapport*, 1991, No.152, p.50-55, 3 refs.
Bugnon, C., Gothenborg, J.
Exploration, Minerals, Natural resources, Economic development, Greenland.

46-3466
Geochemical mapping: distribution of gold, arsenic, antimony and tantalum in south Greenland.
Steenfelt, A., et al, *Grönlands geologiske undersögelse. Rapport*, 1991, No.152, p.55-61, 29 refs.
Tukiainen, T.
Exploration, Minerals, Geochemistry, Natural resources, Gold, Geological maps, Greenland.

46-3467
Registration of kimberlites and other potentially diamond-bearing rocks in Greenland.
Larsen, L.M., *Grönlands geologiske undersögelse. Rapport*, 1991, No.152, p.61-65, 26 refs.
Exploration, Minerals, Geochemistry, Geological maps, Natural resources, Greenland.

46-3468
Present-day expansion of the southern part of the Inland Ice.
Weidick, A., *Grönlands geologiske undersögelse. Rapport*, 1991, No.152, p.73-79, 23 refs.
Ice sheets, Glacier surveys, Glacier oscillation, Climatic changes, Greenland.

46-3469
Ice drilling and mass balance at Pâkitsoq, Jakobshavn, central west Greenland.
Thomsen, H.H., et al, *Grönlands geologiske undersögelse. Rapport*, 1991, No.152, p.80-84, 9 refs.
Olesen, O.B., Braithwaite, R.J., Böggild, C.E.
Glacier surveys, Glacier mass balance, Subglacial drainage, Ice temperature, Ice sheets, Greenland.

46-3470
Snow and avalanche. Annual report 1989-90.
Colorado Avalanche Information Center, Denver, Colorado Geological Survey, June 1990, 59p. + appends.
Snow surveys, Avalanches, Avalanche forecasting, Snowfall, Snowstorms, Accidents, Safety, United States—Colorado.

46-3471
Snow and avalanche. Annual report 1988-89.
Colorado Avalanche Information Center, Denver, Colorado Geological Survey, June 1989, 48p. + appends.
Snow surveys, Avalanches, Avalanche forecasting, Snowfall, Snowstorms, Accidents, Safety, United States – Colorado.

46-3472
Application of stochastic simulation to climatic-change studies.
Woo, M.K., *Climatic change*, Apr. 1992, 20(4), p.313-330, 23 refs.
Climatic changes, Air temperature, Precipitation (meteorology), Forecasting, Simulation, Snow accumulation, Carbon dioxide, Global warming, Mathematical models, Temperature variations.

46-3473
Scattering of electromagnetic waves from a dense medium consisting of correlated Mie scatterers with size distributions and applications to dry snow.
Tsang, L., et al, *Journal of electromagnetic waves and applications*, 1992, 6(3), p.265-286, 29 refs.
Kong, J.A.
Radio waves, Wave propagation, Scattering, Snow cover effect, Attenuation, Dielectric properties, Density (mass/volume), Remote sensing, Analysis (mathematics).

46-3474
Evidence for recent warming from perturbed geothermal gradients: examples from eastern Canada.
Mareschal, J.C., et al, *Climate dynamics*, Jan. 1992, 6(3-4), p.135-143, 25 refs.
Beltrami, H.
Climatic changes, Temperature measurement, Boreholes, Snow cover effect, Surface temperature, Temperature variations, Global warming, Geothermy.

46-3475
Evidence for an early Holocene climatic optimum in the antarctic deep ice-core record.
Ciais, P., et al, *Climate dynamics*, Jan. 1992, 6(3-4), p.169-177, 60 refs.
Ice cores, Paleoclimatology, Glacier ice, Drill core analysis, Isotope analysis, Climatic changes, Air temperature, Temperature variations, Correlation, Antarctica—Vostok Station.
This paper is focused on the Dome C and Vostok cores and on a new 850-m long ice core drilled out at Komsomolskaia by the Soviet Antarctic Expeditions in an attempt to clarify stable isotope content in terms of air temperature variations. These three sites are located in East Antarctica on the antarctic plateau, in a region essentially undisturbed by ice-flow conditions, so that their detailed intercomparison may allow the identification of the climatically significant isotopic signal. Results compare well with the proximal records of Southern Hemisphere high latitudes, and support the existence of a warmer "climatic optimum" between 10 and 6 ka y BP. Maximum temperatures are reached just at the end of the last deglaciation, which confirms previous observations at high latitudes, in contrast with later dates for the Atlantic and hypsithermal optima in Europe and North America. (Auth. mod.)

46-3476
Map, airphoto and field results on the Pleistocene snow-line in the Andes. [Karten-, Luftbild- und Feldbefunde zur pleistozänen Schneegrenze in den Anden],
Schulz, G., *Petermanns Geographische Mitteilungen*, 1991, 135(3), p.209-216, In German with English and Russian summaries. 20 refs.
Pleistocene, Snow line, Mountain glaciers, Glaciation, Cirques, Photointerpretation, Andes.

46-3477
Distributed snowmelt simulations in an alpine catchment. 1. Model evaluation on the basis of snow cover patterns.
Blöschl, G., et al, *Water resources research*, Dec. 1991, 27(12), p.3171-3179, 49 refs.
Kirnbauer, R., Gutknecht, D.
Snow hydrology, Radiation balance, Snowmelt, Simulation, Runoff forecasting, Snow cover distribution, Watersheds, Topographic effects, Albedo, Mathematical models.

46-3478
Distributed snowmelt simulations in an alpine catchment. 2. Parameter study and model predictions.
Blöschl, G., et al, *Water resources research*, Dec. 1991, 27(12), p.3181-3188, 17 refs.
Gutknecht, D., Kirnbauer, R.
Snow hydrology, Snow cover distribution, Snowmelt, Simulation, Snow water equivalent, Runoff forecasting, Watersheds, Topographic effects, Albedo, Accuracy.

46-3479
Effect of oil viscosity on transformer loading capability at low ambient temperatures.
Aubin, J., et al, *IEEE transactions on power delivery*, Apr. 1992, 7(2), p.516-524, 7 refs. Includes discussion.
Langhame, Y.
Electric power, Electric equipment, Electrical insulation, Crude oil, Loading, Viscosity, Cold weather performance, Temperature effects, Thermal analysis.

46-3480
Power transmission line maintenance information system for Hokusei line with snow accretion monitoring capability.
Sato, K., et al, *IEEE transactions on power delivery*, Apr. 1992, 7(2), p.946-951, 4 refs.
Atsumi, S., Shibata, A., Kanemaru, K.
Transmission lines, Winter maintenance, Snow accumulation, Ice accretion, Monitors, Sensors, Detection, Design, Photographic techniques.

46-3481
Ice sheets and ice streams: thoughts on the Cordilleran Ice Sheet Symposium.
Mathews, W.H., *Géographie physique et Quaternaire*, 1991, 45(3), Cordilleran Ice Sheet Symposium, Vancouver, British Columbia, May 1990. Edited by L.E. Jac' son, Jr. et al, p.263-267, With French summary. 11 refs.
Pleistocene, Ice sheets, Glacier flow, Glaciation, Terminology, Accuracy, Mountain glaciers, Glacial geology, Geomorphology, Antarctica—Ross Ice Shelf
This paper comments on preconceptions about what is meant by the terms "Cordilleran Ice Sheet" and "ice stream". Contemporary antarctic ice streams are described. The Laurentian Channel and troughs crossing the continental ice shelf between Vancouver and Queen Charlotte Is. are suggested as candidates for the tracks of past ice streams. (Auth.)

46-3482
Cordilleran Ice Sheet: one hundred and fifty years of exploration and discovery.
Jackson, L.E., Jr., et al, *Géographie physique et Quaternaire*, 1991, 45(3), Cordilleran Ice Sheet Symposium, Vancouver, British Columbia, May 1990. Edited by L.E. Jackson, Jr. et al, p.269-280, With French and German summaries. Refs. p.277-280.
Clague, J.J.
Pleistocene, Glacier flow, Ice sheets, Glaciation, Glacier oscillation, Glacial geology, Geomorphology, Mountain glaciers.

46-3483
Conceptual model for growth and decay of the Cordilleran Ice Sheet.
Fulton, R.J., *Géographie physique et Quaternaire*, 1991, 45(3), Cordilleran Ice Sheet Symposium, Vancouver, British Columbia, May 1990. Edited by L.E. Jackson, Jr. et al, p.281-286, With French and German summaries. 15 refs.
Pleistocene, Ice sheets, Glacier oscillation, Glaciation, Glacial geology, Models, Mountain glaciers, Geomorphology.

46-3484
Modeling the Cordilleran Ice Sheet.
Roberts, B.L., *Géographie physique et Quaternaire*, 1991, 45(3), Cordilleran Ice Sheet Symposium, Vancouver, British Columbia, May 1990. Edited by L.E. Jackson, Jr. et al, p.287-299, With French and German summaries. 37 refs.
Pleistocene, Ice sheets, Glacier flow, Glacier oscillation, Glacier mass balance, Computerized simulation, Glacial geology, Topographic features.

46-3485
Glacier physics of the Puget lobe, southwest Cordilleran Ice Sheet.
Booth, D.B., *Géographie physique et Quaternaire*, 1991, 45(3), Cordilleran Ice Sheet Symposium, Vancouver, British Columbia, May 1990. Edited by L.E. Jackson, Jr. et al, p.301-315, With French and German summaries. Refs. p.313-315.
Pleistocene, Glaciation, Ice sheets, Glacial geology, Glacial hydrology, Subglacial drainage, Meltwater, Water pressure, Ice solid interface.

46-3486
Glaciolacustrine sedimentation during advance and retreat of the Cordilleran Ice Sheet in central British Columbia.
Eyles, N., et al, *Géographie physique et Quaternaire*, 1991, 45(3), Cordilleran Ice Sheet Symposium, Vancouver, British Columbia, May 1990. Edited by L.E. Jackson, Jr. et al, p.317-331, With French and German summaries. 42 refs.
Clague, J.J.
Pleistocene, Lacustrine deposits, Ice sheets, Glaciation, Glacial geology, Sedimentation, Glacial deposits, Glacier oscillation, Geomorphology.

46-3487
Climatic conditions in the western and northern Cordillera during the last glaciation: paleoecological evidence.
Mathewes, R.W., *Géographie physique et Quaternaire*, 1991, 45(3), Cordilleran Ice Sheet Symposium, Vancouver, British Columbia, May 1990. Edited by L.E. Jackson, Jr. et al, p.333-339, With French and German summaries. 60 refs.
Pleistocene, Ice sheets, Paleoecology, Paleoclimatology, Geomorphology.

46-3488
Last Cordilleran Ice Sheet in southern Yukon Territory.
Jackson, L.E., Jr., et al, *Géographie physique et Quaternaire*, 1991, 45(3), Cordilleran Ice Sheet Symposium, Vancouver, British Columbia, May 1990. Edited by L.E. Jackson, Jr. et al, p.341-354, With French and German summaries. 52 refs.
Ward, B., Duk-Rodkin, A., Hughes, O.L.
Pleistocene, Ice sheets, Glacial geology, Glacier oscillation, Glacier flow, Glaciation, Climatic factors, Mountain glaciers, Stratigraphy.

46-3489
Cordilleran Ice Sheet in northern British Columbia.
Ryder, J.M., et al, *Géographie physique et Quaternaire*, 1991, 45(3), Cordilleran Ice Sheet Symposium, Vancouver, British Columbia, May 1990. Edited by L.E. Jackson, Jr. et al, p.355-363, With French and German summaries. 48 refs.
Maynard, D.
Pleistocene, Ice sheets, Glacial geology, Glaciation, Glacier flow, Geomorphology.

46-3490
Cordilleran Ice Sheet and the glacial geomorphology of southern and central British Columbia.
Ryder, J.M., et al, *Géographie physique et Quaternaire*, 1991, 45(3), Cordilleran Ice Sheet Symposium, Vancouver, British Columbia, May 1990. Edited by L.E. Jackson, Jr. et al, p.365-377, With French and German summaries. Refs. p.375-377.
Fulton, R.J., Clague, J.J.
Pleistocene, Ice sheets, Geomorphology, Glaciation, Glacial geology, Glacier flow, Glacial lakes, Isostasy.

46-3491
Proceedings.
Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990, Golden, CO, International Society of Offshore and Polar Engineers, 1990, 3 Vols., Refs. passim. For selected papers see 46-3492 through 46-3507.
Chung, J.S., ed, Kaneko, K., ed.
DLC TC1665.P34 1990
Petroleum industry, Offshore structures, Construction, Economic development, Ice solid interface, Ice mechanics, Materials, Pipelines, Cold weather construction.

46-3492
Engineering: an essential means for conserving Antarctica and achieving cost-effective built infrastructure.
Rohde, H.F., Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.1. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.29-38, 21 refs.
DLC TC1665.P34 1990
Cold weather construction, Cost analysis, Environmental impact, Countermeasures, Engineering.
Antarctica's isolation and harshness has demanded the support of highly engineered built infrastructure. There is a burgeoning acknowledgment that much of this infrastructure is destroying the environment and is extraordinarily expensive, which in turn compromises and bleeds research programs, and is an embarrassment to many nations. The source of these problems is twofold: political and economic short-sightedness, and the reliance of antarctic engineering on the simplistic application of polar technology based on arctic research and experience. A new integrated philosophy of engineering is proposed based on antarctic conditions, environmental protection, human significance and life-cycle cost-effectiveness. Two feasibility studies of projects, one large and one small, provide a glimpse of the substantial environmental, scientific, inspirational, commercial and Treaty benefits of built infrastructure employing such an engineering philosophy. (Auth. mod.)

46-3493
Wind loads on and snowdrift around antarctic buildings.
Kim, D.H., et al, Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.1. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.45-50, 18 refs.
Kwok, K.C.S., Rohde, H.F.
DLC TC1665.P34 1990
Buildings, Cold weather performance, Snowdrifts, Snow cover effect, Wind factors, Design criteria, Simulation, Turbulent boundary layer.
Antarctic building designers are confronted with minimal research data on wind loads and snowdrifting around buildings and structures. This paper seeks to address this deficiency. The design feature affecting the performance of antarctic buildings in terms of snowdrift clearance and design loading appears to be the building shape facing the wind and the elevation of the building from the ground. The wind-induced loads on and snowdrifting formation around a number of different shapes of on-ground and elevated buildings were investigated. This research provides vital information for the prediction of snowdrifting around antarctic buildings and will play a major role in antarctic building design in the future. (Auth. mod.)

46-3494
Study on prediction of snowdrift around buildings in Antarctica.
Mitsuhashi, H., Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.1. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.59-64, 4 refs.
DLC TC1665.P34 1990
Buildings, Snowdrifts, Blowing snow, Forecasting, Wind factors, Simulation, Design criteria.
In this paper the author describes the wind tunnel experiment of an artificial snowstorm in which model snow is used as one of the means of predicting the patterns of snowdrifts and the quantity of piled up snow around the buildings of an observation base in Antarctica. The reproducibility of this method of experiment is also investigated. Further investigations consider the fundamental properties of snowdrifts, and their relation to effective height parameters for elevated buildings. Also reported is an example of application of this experiment to the prediction of snowdrifts around buildings planned for construction in Antarctica. (Auth. mod.)

46-3495
Benefit and use of phase change thermal storage in buildings in the antarctic environment.
Rieck, I., et al, Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.1. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.65-71, 5 refs.
Radford, W.
DLC TC1665.P34 1990
Buildings, Heat recovery, Materials, Heating, Cold weather performance, Design, Phase transformations, Cost analysis.
This paper discusses the use of new phase change materials (PCMs) in high density thermal storage as modular 'heat banks' in the antarctic infrastructure, to assist energy management and significantly reduce energy consumption. These new heat banks provide cost effective means to collect and store waste, rejected and off-peak energy for recycling later during the peak-demand period, to provide 'free' space heating, hot water, or process heat, and allow significant reduction in the size of plant and equipment such as generators, heat pumps, boilers etc. This paper also deals with other techniques utilizing PCMs to provide automatic passive systems to protect personnel and/or electronic equipment in the event of adverse high or low temperature excursions, due to malfunction of other environment control equipment. (Auth. mod.)

46-3496
Wind and ice effects on dams of tidal power stations in the Okhotsk Sea.
IAkunin, L.P., Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.1. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.227-231, 3 refs.
DLC TC1665.P34 1990
Dams, Electric power, Reservoirs, Fast ice, Ice prevention, Ice cover effect, Ice solid interface, Design criteria, Wind factors.

46-3497
Construction of transmission and field pipelines in severe environmental conditions in the USSR.
Shakirov, R.M., Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.1. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.353-360.
DLC TC1665.P34 1990
Underground pipelines, Cold weather construction, Materials, Pipes (tubes), Performance, Manufacturing, Welding, Physical properties, Design.

46-3498
Influence of grounded ice hummocks on pipelines.
Polomoshnov, A.M., et al, Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.1. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.401-407, 7 refs.
Truskov, P.A., IAkunin, L.P.
DLC TC1665.P34 1990
Offshore structures, Underground pipelines, Grounded ice, Sea ice, Ice scoring, Hummocks, Trenching, Design criteria.

46-3499
Iceberg drift motions near a large structure.
Isaacson, M., et al, Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.2. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.265-270, 11 refs.
McTaggart, K.
DLC TC1665.P34 1990
Icebergs, Drift, Hydrodynamics, Ice water interface, Offshore structures, Water waves, Simulation, Fluid dynamics.

46-3500
Structural response to cyclic ice force.
Liubimov, V.S., et al, Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.2. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.331-334, 4 refs.
Khrapatyi, N.G., Zanegin, V.G.
DLC TC1665.P34 1990
Offshore structures, Sea ice, Ice loads, Dynamic loads, Ice solid interface, Mathematical models, Structural analysis, Design criteria.

46-3501
Stochastic model of ice force on offshore structure in time domain.
Bekker, A.T., et al, Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.2. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.335-339, 8 refs.
Perepelitsa, A.N.
DLC TC1665.P34 1990
Offshore structures, Sea ice, Ice loads, Dynamic loads, Ice solid interface, Mathematical models, Forecasting

46-3502
Study of strudel scours in the Alaskan Beaufort Sea.
Machemehl, J.L., et al, Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.2. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.341-344, 3 refs.
Jo, C.H.
DLC TC1665.P34 1990
Deltas, Bottom sediment, Hydrodynamics, Bottom ice, Water flow, Erosion, Ice water interface, Design criteria.

46-3503
Seasonal variability of physical-mechanical characteristics of sea ice.
Gavrilo, V.P., et al, Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.1. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.345-352, 16 refs. For another source see 45-3013.
Lebedev, G.A., Fedotov, V.I., Cherepanov, N.V.
DLC TC1665.P34 1990
Sea ice, Ice cover strength, Flexural strength, Porosity, Ice mechanics, Seasonal variations, Analysis (mathematics).

46-3504
Experimental investigations of ice breaking by a moving load.
Kozin, V.M., et al, Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.2. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.353-357, 4 refs.
Novolodskiĭ, I.D.
DLC TC1665.P34 1990
Ice mechanics, Vehicles, Ice sheets, Ice breaking, Dynamic loads, Resonance, Bearing strength, Air cushion vehicles, Simulation.

46-3505
Physical and mechanical properties study of flat ice of the Okhotsk Sea.
Evdokimov, G.N., et al. Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.2. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.359-363, 5 refs.
Rogachko, S.I., Smirnov, G.N.
DLC TC1665.P34 1990
Sea ice, Ice loads, Ice cover strength, Ultimate strength, Simulation, Mechanical properties, Design criteria, Ice mechanics.

46-3506
Ice loads and the ice strength.
Matskevich, D.G., et al. Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.2. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.365-368, 3 refs.
Simakov, G.V., Shkhinek, K.N.
DLC TC1665.P34 1990
Ice loads, Ice solid interface, Sea ice, Ice strength, Pile structures, Ice deformation, Computerized simulation, Offshore structures.

46-3507
Local corrosion of high-strength steel weldments of icebreakers.
Inoue, T., et al. Pacific/Asia Offshore Mechanics Symposium, First, Seoul, Korea, June 24-28, 1990. Proceedings, Vol.3. Edited by J.S. Chung et al, Golden, CO, International Society of Offshore and Polar Engineers, 1990, p.179-183, 7 refs.
Koseki, T., Yukihiko, Y., Tsuzuki, T.
DLC TC1665.P34 1990
Icebreakers, Steels, Corrosion, Joints (junctions), Construction materials, Welding, Low temperature tests.

46-3508
Report of pit-wall observations of snow cover in Sapporo 1990-91.
Akitaya, E., et al. *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1991, No.50, p.1-8, In Japanese. 4 refs.
Shiraiwa, T., Ozeki, T.
Snow surveys, Snow depth, Snow hardness, Snow density, Snow temperature, Snow water content, Japan—Sapporo.

46-3509
Regional observations of snow cover in Hokkaido, February 1991.
Ishii, Y., et al. *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1991, No.50, p.9-24, In Japanese. 5 refs.
Akitaya, E., Satow, K.
Snow surveys, Snow depth, Snow impurities, Snow water content, Snow density, Snow hardness, Japan—Hokkaido.

46-3510
Observations of snow metamorphism with varying temperature field near the surface.
Fukuzawa, T., et al. *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1991, No.50, p.25-31, In Japanese. 1 ref.
Akitaya, E.
Metamorphism (snow), Snow temperature, Snow thermal properties, Depth hoar, Snow surface.

46-3511
Variation of air temperature in the Taisetsu Mountains in winter, October, 1990-June, 1991.
Tachibana, Y., et al. *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1991, No.50, p.33-45, In Japanese.
Kodama, Y., Yamada, T.
Air temperature, Frost forecasting, Meteorological data, Weather observations, Weather stations, Diurnal variations, Japan—Hokkaido.

46-3512
Glacier inventory of the Langtang Valley, Nepal Himalayas.
Shiraiwa, T., et al. *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1991, No.50, p.47-72, With Japanese summary. 6 refs.
Yamada, T.
Glacier surveys, Glacier oscillation, Mountain glaciers, Climatic changes, Nepal.

46-3513
Frost heave observation in Tomakomai (1982-1991).
Ishizaki, T., et al. *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1991, No.50, p.73-92, In Japanese. 7 refs.
Fukuda, M., Harada, K., Torita, H.
Soil freezing, Frost heave, Frost penetration, Air temperature, Degree days, Japan—Hokkaido.

46-3514
Distribution of pack ice off Okhotsk Sea coast of Hokkaido observed with sea ice radar network, January-March, 1991.
Ishikawa, M., et al. *Low temperature science (Teion kagaku). Series A Physical sciences. Data report,* 1991, No.50, p.93-108, In Japanese.
Sea ice distribution, Ice reporting, Radar tracking, Japan—Hokkaido.

46-3515
Observations of the quick formation of a depth hoar layer.
Fukuzawa, T., et al. *Low temperature science (Teion kagaku). Series A Physical sciences,* 1991, No.50, p.1-7, In Japanese with English summary. 7 refs.
Akitaya, E.
Depth hoar, Metamorphism (snow), Snow surface, Snow stratigraphy, Snow air interface, Snow temperature.

46-3516
Experimental study on the growth rates of depth hoar crystals at high temperature gradients (I).
Fukuzawa, T., et al. *Low temperature science (Teion kagaku). Series A Physical sciences,* 1991, No.50, p.9-14, In Japanese with English summary. 6 refs.
Akitaya, E.
Depth hoar, Metamorphism (snow), Ice crystal growth, Snow temperature, Temperature gradients, Snow stratigraphy.

46-3517
Characteristics of the snow cover in winter of 1990-1991 in Sapporo.
Akitaya, E., et al. *Low temperature science (Teion kagaku). Series A Physical sciences,* 1991, No.50, p.15-21, In Japanese with English summary. 13 refs.
Shiraiwa, T., Ozeki, T.
Snow surveys, Snow depth, Snow water equivalent, Snow cover stability, Snowfall, Japan—Sapporo.

46-3518
Dual Doppler radar measurements of a 3-dimensional kinematic wind field.
Satoh, S., et al. *Low temperature science (Teion kagaku). Series A Physical sciences,* 1991, No.50, p.23-35, In Japanese with English summary. 13 refs.
Wakahama, G.
Radar tracking, Wind velocity, Snowstorms, Radar echoes, Clouds (meteorology), Wind direction, Weather forecasting.

46-3519
Computer graphics imagings of data from three-dimensionally scanning radar observation of snowfall.
Oi, M., et al. *Low temperature science (Teion kagaku). Series A Physical sciences,* 1991, No.50, p.37-43, In Japanese with English summary. 6 refs.
Satoh, S.
Radar tracking, Snowstorms, Data processing, Weather forecasting, Computer programs.

46-3520
Measurements of momentum and heat fluxes over open water, sea ice and surface on Elson Lagoon, Alaska.
Shirasawa, K., et al. *Low temperature science (Teion kagaku). Series A Physical sciences,* 1991, No.50, p.45-56, In Japanese with English summary. 12 refs.
Takatsuka, T., Ikeda, M.
Ice air interface, Snow air interface, Ice heat flux, Snow heat flux, Sea ice, Air water interactions, Wind velocity, Ice cover effect, Drift, Turbulent boundary layer.

46-3521
Measurement of electrical resistivity of frozen soils.
Harada, K., et al. *Low temperature science (Teion kagaku). Series A Physical sciences,* 1991, No.50, p.57-68, In Japanese with English summary. 8 refs.
Fukuda, M., Ishizaki, T.
Frozen ground physics, Electromagnetic prospecting, Ground ice, Electrical resistivity, Unfrozen water content, Ice electrical properties.

46-3522
Measurement of unfrozen water content by pulsed nuclear magnetic resonance.
Ishizaki, T., et al. *Low temperature science (Teion kagaku). Series A Physical sciences,* 1991, No.50, p.69-75, In Japanese with English summary. 13 refs.
Fukuda, M., Hirano, A.
Frozen ground thermodynamics, Unfrozen water content, Nuclear magnetic resonance.

46-3523
Report on a disaster of the Kariba Bridge swept away.
Akitaya, E., et al. *Low temperature science (Teion kagaku). Series A Physical sciences,* 1991, No.50, p.77-81, In Japanese. 3 refs.
Fukuzawa, T., Nishimura, K.
Floods, Avalanches, Bridges, Accidents, Snowstorms, Avalanche tracks, Japan—Hokkaido.

46-3524
Karst resources and their conservation in Norway.
Lauritzen, S.E., *Norsk geografisk tidsskrift,* Sep. 1991, 45(3), p.119-142, 61 refs.
Karst, Caves, Hydrogeochemistry, Subsurface drainage, Topographic features, Paleoclimatology, Norway.

46-3525
Subaerial modification of glacier bedforms immediately following ice wastage.
Rose, J., *Norsk geografisk tidsskrift,* Sep. 1991, 45(3), p.143-153, 25 refs.
Glacial deposits, Glacier beds, Mass movements (geology), Glacial geology, Periglacial processes, Sediment transport, Solifluction, Norway.

46-3526
Form and size characteristics of clasts on stone-banked solifluction lobes, Okstindan, North Norway.
Harrison, S., et al, *Norsk geografisk tidsskrift,* Sep. 1991, 45(3), p.155-160, 14 refs.
Macklin, M.G.
Glacial deposits, Solifluction, Periglacial processes, Glacial geology.

46-3527
Construction in areas of extreme climatic and complex geological conditions. MP 3109, Office of the *Chief of Engineers, U.S. Army Corps of Engineers,* 6 Apr. 1986, 91p., Meeting of Working Group 10.5 of the U.S./U.S.S.R. Joint Commission on Cooperation in the Field of Housing and Other Construction, 17-20 March 1986, Leningrad and Yakutsk, U.S.S.R.
Meetings, International cooperation, Cold weather construction, Foundations, Buildings, Permafrost beneath structures, Concrete piles, Pile load tests.

46-3528
Antarctica Project. Environmental impact: chemical methodologies. [Rome, Italian Research Council, 1991], p.275-613, Reprinted from Annali di chimica, 1991, Vol.81(7-8 and 9-10). Refs. passim. For individual papers see B-46150, B-46168, E-46151, E-46154, E-46157, E-46158, E-46161, E-46164, F-46148, I-46155, I-46159, I-46167, I-46170, J-46145 through J-46147, J-46149, J-46152, J-46153, J-46156, J-46160, J-46162, J-46163, J-46165, J-46166 and J-46169 or 46-3529 through 46-3536.
Environmental impact, Atmospheric composition, Sea water, Ice composition, Snow composition, Impurities, Antarctica—Terra Nova Bay Station.
This volume presents reprints from Vol. 81, Nos. 7-8 and 9-10, of the Annali di chimica, published by the Italian Chemical Society in Rome, 1991. Both issues contain reports from research units of various Italian expeditions to Antarctica between 1987 and 1989. The research projects focused on the chemical composition of the atmosphere, as well as terrestrial and marine environments (sea water, sediments, suspended matter, ice, fish, fresh water, snow, aerosols) and on the human factor resulting from activities at the Terra Nova Bay Station.

46-3529
Determination of some heavy metals in snow and sea water at Terra Nova Bay (Antarctica).
Saini, G., et al, Antarctica Project. Environmental impact: chemical methodologies, [Rome, Italian Research Council, 1991], p.317-324, Reprinted from Annali di chimica, 1991, Vol.81(7-8 and 9-10). 16 refs.
Baiocchi, C., Giacosa, D., Roggero, M.A.
Snow impurities, Chemical composition, Sea water, Antarctica—Terra Nova Bay Station, Antarctica—Ross Sea.
Samples of seawater and of snow collected by the Italian expedition to Antarctica in 1988-89 in the area of the Terra Nova Bay Station and in the Ross Sea have been analyzed for Cu, Ni, Cd, Cr and Mn. Preconcentration of seawater samples has been made by reductive precipitation, while snow samples have been lyophilized. The determinations were made by GFAAS with Zeeman background correction. The results, showing highest concentrations of the elements in the vicinity of the Station, are discussed. (Auth.)

46-3530
Determination of some organic and inorganic substances present at PPB level in antarctic snow and ice by ion chromatography.
Udisti, R., et al, Antarctica Project. Environmental impact: chemical methodologies, [Rome, Italian Research Council, 1991], p.325-341, Reprinted from Annali di chimica, 1991, Vol.81(7-8 and 9-10). 35 refs.
Barbolani, E., Piccardi, G.
Ice composition, Snow impurities, Snow composition, Chemical analysis.
An ion chromatographic method for the determination of some components at trace levels in snow and ice samples collected during the Italian Antarctic Expedition 1987-88 is developed. The separation of fluorides, acetates, propionates, formiates and methansulphonates and their determination at concentrations lower than 1 microgram/l is achieved using Na2B4O7 as eluent in the gradient mode. Cluster analysis carried out for the components whose diffusion is mainly atmospheric shows good correlations within different classes of compounds. The contribution of methansulphonic acid, which is an index of marine biological activity, to the natural cycle of the sulphur compounds has been evaluated together with the percentage of the organic contribution to the total antionic charge in the snow precipitation. (Auth.)

46-3531
Evaluation of pack melting effect on polychlorobiphenyl content in sea water samples from Terra Nova Bay, Ross Sea (Antarctica).
Fuoco, R., et al, Antarctica Project. Environmental impact: chemical methodologies, [Rome, Italian Research Council, 1991], p.383-394, Reprinted from Annali di chimica, 1991, Vol.81(7-8 and 9-10). 11 refs.
Colombini, M.P., Abete, C.
Ice melting, Sea water, Chemical composition, Water pollution, Antarctica—Terra Nova Bay.
The total contents of PCB in sea water samples collected in Terra Nova Bay during the Italian expedition of 1988-1989 are reported along with individual PCB isomer concentrations. Liquid-liquid extraction with n-hexane was found to be more reproducible than solid-liquid extraction. Clean-up of extracts was effected on a Florisil column which in experimental conditions eliminates interferences due to other chlorinated pesticides. PCB determination and identification were performed by high resolution gas-chromatography (HRGC) and HRGC/FT-IR spectrometry respectively. The results obtained showed for the area under study a typical value of 0.6 ng/l as total PCB concentration and a temporary local increase up to 1.7 ng/l which may be due to pack melting. Distribution among congener classes showed a chlorination level similar to that observed for oceanic waters and centering on three to penta substituted isomers. (Auth.)

46-3532
Organic compounds in sea water and pack ice in Terra Nova Bay (Antarctica).
Desideri, P., et al, Antarctica Project. Environmental impact: chemical methodologies, [Rome, Italian Research Council, 1991], p.395-416, Reprinted from Annali di chimica, 1991, Vol.81(7-8 and 9-10). 5 refs.
Lepri, L., Checchini, L.
Water pollution, Ice composition, Ice melting, Sea water, Chemical composition, Antarctica—Terra Nova Bay.
Sea water and pack ice samples taken from Terra Nova Bay during the 1988/89 4th Italian expedition to Antarctica were analyzed by using High Resolution Gas Chromatography (HRGC) and GC-MS. Several biogenic and anthropogenic organic compounds were identified in the two matrices. Some classes of organic compounds were more prevalent in pack ice than in the sea water under the pack, and in the sea water taken at the surface during the natural melting process of the pack. The results were compared with those obtained from the sea water samples taken during the previous expedition (1987/88). (Auth.)

46-3533
Air-sea exchange in antarctic environment and snow microcomponents.
Loglio, G., et al, Antarctica Project. Environmental impact: chemical methodologies, [Rome, Italian Research Council, 1991], p.453-467, Reprinted from Annali di chimica, 1991, Vol.81(7-8 and 9-10). 12 refs.
Air water interactions, Sea water, Chemical analysis, Water pollution, Aerosols, Snow impurities, Antarctica—Terra Nova Bay, Antarctica—Melbourne, Mount.
The process of the air-sea exchange of matter was studied in Terra Nova Bay seawater with the aim of characterizing the antarctic marine environment. The samples were collected during the expeditions of 1988-1989 and 1989-1990. The presence of surfactant and fluorescent materials is evidenced in the snow. On the basis of laboratory experiments, a photochemical effect on these components is suggested for high-altitude snow depositions. Laboratory investigations on the formation of sea-water aerosol appear useful for a better understanding of natural aerosol transport. (Auth.)

46-3534
Radionuclide content in various samples collected near the Italian base in Antarctica.
Battiston, G.A., et al, Antarctica Project. Environmental impact: chemical methodologies, [Rome, Italian Research Council, 1991], p.469-475, Reprinted from Annali di chimica, 1991, Vol.81(7-8 and 9-10). 4 refs.
Degetto, S., Gerbasi, R., Sbrignadello, G.
Snow impurities, Snow composition, Radioactivity, Soil chemistry, Lacustrine deposits, Mosses, Antarctica—Terra Nova Bay Station.
Samples of snow, soil, lake sediments and mosses, collected at several stations near the Terra Nova Bay Station, were analyzed for concentrations of natural and man-made radionuclides in order to determine their mobility in that region. The radioactivity data obtained show different values at different locations; tabulated results are discussed.

46-3535
Chlorinated pesticides in sea water and pack ice in Terra Nova Bay (Antarctica).
Desideri, P., et al, Antarctica Project. Environmental impact: chemical methodologies, [Rome, Italian Research Council, 1991], p.533-540, Reprinted from Annali di chimica, 1991, Vol.81(7-8 and 9-10). 22 refs.
Lepri, L., Santianni, D., Checchini, L.
Sea water, Water pollution, Ice composition, Impurities, Sea ice, Antarctica—Terra Nova Bay.
Sea water, pack and particulate samples collected around the Italian research station in Antarctica and the adjacent Terra Nova Bay from Dec. 1988 to Feb. 1989 were analyzed for the presence of chlorinated pesticides; HCHs, DDTs, aldrin, dieldrin and heptachlor were found. The concentrations of HCH isomers (alfa-HCH and lindane) were nearly the same as those reported by Tanabe *et al.* in different areas of Antarctica in the period Dec. 1980-Mar. 1982. (Auth.)

46-3536
Long lasting pesticides in antarctic surface fresh water.
Buiarelli, F., et al, Antarctica Project. Environmental impact: chemical methodologies, [Rome, Italian Research Council, 1991], p.589-593, Reprinted from Annali di chimica, 1991, Vol.81(7-8 and 9-10). 3 refs.
Cartoni, G., Vicedomini, M., Zoccolillo, L.
Water pollution, Limnology, Meltwater, Human factors, Antarctica—Terra Nova Bay Station.
The procedure used for the analysis of antarctic samples of surface fresh water taken during the 1988-89 Italian expedition is reported. After solvent extraction, samples were examined to evaluate the presence of some chlorinated pesticides by GC with ECD and GC-MS. Many small peaks with retention times in the PCB and chlorinated pesticides range were observed in GC-ECD. None of the observed peaks among the chlorinated pesticides was identified by SIM-GC-MS. The detection limit of 8 chlorinated pesticides including lindane and p,p'DDT, obtained by SIM-GC-MS, is reported. (Auth.)

46-3537
Contributions to antarctic research II.
Elliot, D.H., ed, *American Geophysical Union. Antarctic research series*, 1991, Vol.53, 112p., Refs. passim. For individual papers see 46-3538 through 46-3541 or E-46172, E-46174, E-46175 and F-46173.
Research projects, Geology, Antarctica.
This is one of a series to present the results of the U.S. Antarctic Research Program. The volume contains four papers on the pedogenic linkage between arctic and antarctic desert soils; ablation rates of ice fields near the Allan Hills; paleoenvironmental interpretation of fine-grained Permian clastics from the Beardmore Glacier region; and the west antarctic rift system.

46-3538
Pedogenic linkage between the cold deserts of Antarctica and the polar deserts of the high Arctic.
Tedrow, J.C.F., *American Geophysical Union. Antarctic research series*, 1991, Vol.53, Contributions to antarctic research II, p.1-17, 99 refs.
Desert soils, Cryogenic soils, Soil chemistry, Soil classification, Soil formation.
The cold deserts of Antarctica and the polar deserts of the high Arctic have cryogenic soils with desertlike features. Both sectors have soils with a mineral appearance, desert pavement, small to nonexistent organic components, and low ground temperatures. Both are underlain by permafrost and are subject to cryogenic processes. Whereas virtually all of the soils in Antarctica are well drained, in the high Arctic they are not. Polar desert soils generally have a more acid reaction than cold desert soils. Moisture regimes are quite different in the two sectors. Cold desert soils have a dry condition even down to the frost table. Polar desert soils above the receding frost table are usually quite wet. The humus component in cold desert soils is usually nil, but in the polar desert soils it is commonly as much as 1% to 2% or higher. Whether there are enough distinct differences between the two soils to recognize two different categories remains somewhat moot. After equating all information, however, one appears to be justified in tentatively recognizing two distinct soils. (Auth. mod.)

46-3539
Ablation rates of the ice fields in the vicinity of the Allan Hills, Victoria Land, Antarctica.
Faure, G., et al, *American Geophysical Union. Antarctic research series*, 1991, Vol.53, Contributions to antarctic research II, p.19-31, 9 refs.
Buchanan, D.
Ice sheets, Glacier ablation, Seasonal ablation, Moraines, Glacier surveys, Glacier surfaces, Antarctica—Allan Hills.
The ablation rates on the ice fields west of the Allan Hills were determined by measuring the lowering of the ice surface, recorded by 265 wooden dowels implanted in the ice, at the end of the summer and again 2 years later. The results were used to estimate both annual and summer ablation rates at the Elephant Moraine, the Reckling Moraine, and the Main ice field of the Allan Hills. The average annual ablation rates increase toward the edge of the ice sheet from 4.1 +/- 0.1 cm/yr at Elephant Moraine to 4.7 +/- 0.2 cm/yr at Reckling Moraine and to 5.3 +/- 0.1 cm/yr at the Allan Hills. Almost all of the ablation for the year occurs in about 70 days in summer. The average annual and summer ablation rates within the moraines are significantly lower than those of the open ice fields. The difference can be attributed to the presence of snow and rock clasts on the surface of the ice. (Auth. mod.)

46-3540
Contributions of sedimentologic, thermal alteration, and organic carbon data to paleoenvironmental interpretation of fine-grained Permian clastics from the Beardmore Glacier region, Antarctica.
Horner, T.C., et al, *American Geophysical Union. Antarctic research series*, 1991, Vol.53, Contributions to antarctic research II, p.33-65, 35 refs.
Krissek, L.A.
Paleoclimatology, Stratigraphy, Geochemistry, Lithology, Sediments, Glacial deposits, Antarctica—Beardmore Glacier.
Field relations and total organic carbon (TOC) contents have been studied in the finer-grained portions of four Permian formations from the Beardmore Glacier region. Special emphasis has been given to the fine-grained facies because of their potential significance as carriers of paleoclimatic data. In ascending order, the Permian section consists of the Pagoda, Mackellar, Fairchild, and Buckley formations. The Pagoda Formation is composed of sheared gray-green diamictite with minor amounts of sandstone, siltstone and shale, and is interpreted to be a glacial deposit. The Mackellar Formation is composed of interbedded sandstone, siltstone, and shale, and is interpreted to be a shallow deltaic deposit. The Fairchild Formation is dominated by sandstone beds and is interpreted to be a braided stream deposit. The Buckley Formation consists of sandstone with lesser amounts of siltstone, shale, and coal and was formed by braided stream systems and the associated floodplain deposition. The fine-grained intervals of the Pagoda, Mackellar, Fairchild, and Buckley formations have mean TOC contents of 0.20%, 0.33%, 0.98%, and 21.64%, respectively. These large-scale (interformational) differences in the mean TOC content of unaltered samples are interpreted to record an upsection increase in regional productivity, consistent with the general pattern of climatic warming and the decay of the Carboniferous/Permian ice sheet. (Auth. mod.)

46-3541
West antarctic rift system: a review of geophysical investigations.
Behrendt, J.C., et al, *American Geophysical Union. Antarctic research series*, 1991, Vol.53, Contributions to antarctic research II, p.67-112, 159 refs.
Tectonics, Earth crust, Geophysical surveys, Subglacial observations, Geochronology, Continental drift, Antarctica—West Antarctica.
The west antarctic rift system extends over a 3000 x 750 km, largely ice-covered area from the Ross Sea to the Bellingshausen Sea. A spectacular rift-shoulder scarp extends from northern Victoria Land-Queen Maud Mountains to the Ellsworth-Whitmore-Horlick Mountains. The Transantarctic Mountains have been rising since about 60 Ma at episodic rates of the order of 1 km/m.y. most recently since mid-Pliocene time rather than continuously at the mean rate of 100 m/m.y. There is a possible synergistic relation between episodic tectonism in the west antarctic rift system and the waxing and waning of the antarctic ice sheet since Oligocene (or earlier) time. Large offset seismic profiles indicate 17-21 km thickness for the crust in the Ross Sea. A regional positive gravity anomaly throughout the Byrd Subglacial Basin indicates that the crust is approximately 20 km thick, rather than the 30 km reported in earlier interpretations. The west antarctic rift system is due to a continuation of Gondwana breakup that started in the Jurassic, proceeded clockwise around East Antarctica, is still active and may have been so since the late Mesozoic. (Auth. mod.)

46-3542
Analysis of the causes of damage to mooring structures in the Far North. [Analiz prichin avarii prichal'nykh sooruzhenii Kraĭnego Severa].
Omel'chenko, IU.M., Issledovaniia inzhenernykh sooruzhenii i peregruzochnogo oborudovaniia morskikh portov; sbornik nauchnykh trudov (Studies of engineering structures and overloaded facilities in sea ports; collected scientific papers). Edited by P.I. IAkovlev, Moscow, Mortekhinformreklama, 1991, p.31-33, In Russian. 6 refs.
Moorings, Cold weather operation, Damage.

46-3543
Durability and reliability of the rolling stock of railroads. [Prochnost' i bezotkaznost' podvizhnogo sostava zheleznykh dorog],
Savos'kin, A.N., et al, Moscow, Mashinostroenie, 1990, 286p. (Pertinent p.171-188), In Russian. 25 refs.
Fatigue (materials), Life (durability), Railroad cars, Railroad equipment, Railroads, Cold weather operation, Cold weather performance, Temperature effects.

46-3544
Long range forecasting of water temperature in the Barents and Norwegian Seas. [O dolgosrochnykh prognozakh temperatury vody v Barentsevom i Norvezhskom moriakh],
Seriakov, E.I., *Leningrad [St. Petersburg]. Gidrometeorologicheskii nauchno-issledovatel'skii tsentr SSSR. Trudy*, 1991, Vol.314, p.112-121, In Russian. 7 refs.
Long range forecasting, Water temperature, Sea water freezing, Mathematical models, Barents Sea, Norwegian Sea.

46-3545
Developing concrete technology for transportation structures and construction; collected scientific papers. [Progressivnaia tekhnologiia betona dlia transportnykh sooruzhenii i konstruktsii; sbornik nauchnykh trudov],
Kuntsevich, O.V., ed, Leningrad, LIIZhT, 1991, 109p., In Russian. For selected papers see 46-3546 through 46-3550.
Concrete freezing, Concrete admixtures, Concrete durability, Frost resistance, Cement admixtures, Porous materials, Plastics, Rheology, Surfactants.

46-3546
Determining the parameters of dispersed porous materials added to concrete to increase its frost resistance. [Opredelenie parametrov dispersnykh poristykh materialov, vvodimykh v beton s tsel'iu povysheniia ego morozostoikosti],
Kuntsevich, O.V., et al, Progressivnaia tekhnologiia betona dlia transportnykh sooruzhenii i konstruktsii; *sbornik nauchnykh trudov* (Developing concrete technology for transportation structures and construction; collected scientific papers). Edited by O.V. Kuntsevich, Leningrad, LIIZhT, 1991, p.3-7, In Russian. 5 refs.
Tkachuk, M.E.
Concrete admixtures, Concrete durability, Concrete freezing, Frost resistance, Porous materials.

46-3547
Frost resistance of concrete in structures at the Kolyma Power Plant. [Morozostoikost' betona sooruzhenii Kolymskoi GES],
Kuntsevich, O.V., et al, Progressivnaia tekhnologiia betona dlia transportnykh sooruzhenii i konstruktsii; sbornik nauchnykh trudov (Developing concrete technology for transportation structures and construction; collected scientific papers). Edited by O.V. Kuntsevich, Leningrad, LIIZhT, 1991, p.16-20, In Russian. 1 ref.
Frishter, V.IU.
Frost resistance, Concrete freezing, Concrete structures.

46-3548
Effect of superplasticizer-based complex admixtures on the rheological properties of concrete mixtures and the system of parameters of conditionally closed pores in fine-grained concrete with respect to its frost resistance. [Vliianie kompleksnykh dobavok na osnove superplastifikatorov na reologicheskie svoistva betonnykh smesei i sistemu parametrov uslovno zamknutykh por melkozernistogo betona v sviazi s ego morozostoikost'iu],
Poltavchenko, A.N., et al, Progressivnaia tekhnologiia betona dlia transportnykh sooruzhenii i konstruktsii; sbornik nauchnykh trudov (Developing concrete technology for transportation structures and construction; collected scientific papers). Edited by O.V. Kuntsevich, Leningrad, LIIZhT, 1991, p.27-34, In Russian. 2 refs.
Serenko, A.F.
Frost resistance, Concrete freezing, Concrete admixtures, Rheology, Plastics, Cements.

46-3549
Frost resistance of dispersed-reinforced concretes with admixtures of surfactants. [Morozostoikost' dispersno-armirovannykh betonov s dobavkami poverkhnostno-aktivnykh veshchestv],
Serenko, A.F., Progressivnaia tekhnologiia betona dlia transportnykh sooruzhenii i konstruktsii; sbornik nauchnykh trudov (Developing concrete technology for transportation structures and construction; collected scientific papers). Edited by O.V. Kuntsevich, Leningrad, LIIZhT, 1991, p.34-39, In Russian. 2 refs.
Frost resistance, Concrete admixtures, Reinforced concretes, Surfactants, Concrete freezing.

46-3550
Effect of low temperatures on the hardening of cement systems. [Vliianie ponizhennykh temperatur na tverdenie tsementnykh sistem],
Popova, O.S., et al, Progressivnaia tekhnologiia betona dlia transportnykh sooruzhenii i konstruktsii; sbornik nauchnykh trudov (Developing concrete technology for transportation structures and construction; collected scientific papers). Edited by O.V. Kuntsevich, Leningrad, LIIZhT, 1991, p.40-43, In Russian. 2 refs.
An, S.P.
Cement admixtures, Temperature effects, Dielectric properties.

46-3551
Numerical analysis of the migration of gold in snow cover. [Kolichestvennaia otsenka migratsii zolota v snezhnom pokrove],
Fedoseeva, V.I., et al, *Geokhimiia*, Nov. 1991, No.11, p.1656-1660, In Russian. 12 refs.
Fedoseev, N.F.
Analysis (mathematics), Gold, Snow cover, Snow composition, Snow impurities, Migration.

46-3552
Use of scrap rubber in asphalt pavement surfaces.
Eaton, R.A., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1991, SR 91-27, 14p., ADA-249 505, 14 refs.
Roberts, R.J., Blackburn, R.R.
Tires, Bitumens, Rubber, Road icing, Concrete pavements, Rubber ice friction.
Scrap tire rubber was mixed into an asphalt concrete wearing course to study the effect of ice disbonding from the pavement surface under traffic. Rubber contents of 0, 3, 6, and 12% by weight were studied. Initial laboratory ice disbonding test results led to the development of a new paving material, Chunk Rubber Asphalt Concrete (CRAC), that uses larger pieces of rubber in a much denser asphalt concrete mix. Strength values doubled and ice disbonding performance was enhanced.

46-3553
Creep and yield model of ice under combined stress.
Fish, A.M., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1991, SR 91-31, 14p., ADA-249 788, 36 refs.
Ice models, Ice creep, Compressive properties, Stress strain diagrams, Mathematical models, Ice deformation.
Constitutive equations and strength criteria have been developed for ice in a multiaxial stress state. The equations developed describe the entire creep process, including primary, secondary, and tertiary creep, at both constant stresses and constant strain rates in terms of normalized (dimensionless) time. Secondary creep is considered an inflection point defining the time to failure. The minimum strain rate at failure is described by a modified Norton-Glen power equation, which, as well as the time to failure, includes a parabolic yield criterion. The yield criterion is selected either in the form of an extended von Mises-Drucker-Prager or an extended Mohr-Coulomb rupture model. The criteria take into account that at a certain magnitude of mean normal stresses the shear strength of ice reaches a maximum value due to local melting of ice. The model has been verified using test data on the yield of polycrystalline ice at -11.8 C and on creep of saline ice at -5 C, both under triaxial compression.

46-3554
Tests in ice on an antarctic research vessel model.
Tatinclaux, J.-C., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1992, SR 92-03, 41p., ADA-249 789, 6 refs.
Ships, Icebreakers, Design, Models, Pressure ridges, Tests.
A new antarctic research vessel to be chartered by the National Science Foundation was designed and is under construction by North American Shipbuilding, Inc., Larose, LA. A full model test program was required by NSF to verify that the proposed design would meet the vessel operational requirements. In particular, the ship is to break 3 ft (0.9 m) of ice at 3 kn (1.5 m/s) continuously and break through pressure ridges with a 6 ft (1.8 m) sail and a 20 ft (6.1 m) keel. Ice model tests were made in CRREL's ice towing tank. The test program included resistance and propulsion tests in level ice, tests in ridges and ramming tests in ice floes of up to 6 ft (1.83 m) in thickness. The test results described in the report indicate that the proposed ship design with 8.8 MW of power available at the propeller would meet or exceed all operational requirements in ice. The power needed to operate continuously in 3 ft first year level ice at 3 kn was estimated at 6.5 MW; the vessel was found to be able to ram through a 38 ft (11 m) keel ridge; finally, when ramming in 6 ft thick level ice at an impact speed of 6 kn (3.1 m/s) at full power, the vessel was predicted to penetrate by about one-third of a ship length into the ice. (Auth.)

46-3555
Mountain climatology and past and potential future climatic changes in mountain regions: a review.
Barry, R.G., *Mountain research and development*, Feb. 1992, 12(1), p.71-86, With French and German summaries. Refs. p.83-86.
Mountains, Climatology, Climatic factors, Climatic changes, Glacier oscillation, Snow depth, Periodic variations, Meteorological data.

46-3556
Seasonal variation in daily temperature ranges.
Ruschy, D.L., et al, *Journal of climate*, Dec. 1991, 4(12), p.1211-1216, 14 refs.
Baker, D.G., Skaggs, R.H.
Air temperature, Climatology, Seasonal variations, Snow cover effect, Albedo, Solar radiation, Cloud cover, Meteorological data, Diurnal variations.

46-3557
Non-methane hydrocarbons in the arctic atmosphere at Barrow, Alaska.
Doskey, P.V., et al, *Geophysical research letters*, Feb. 21, 1992, 19(4), p.381-384, 23 refs.
Gaffney, J.S.
Atmospheric composition, Air pollution, Hydrocarbons, Sampling, Aerosols, Chemical analysis, Haze, United States—Alaska—Barrow.

46-3558
Making winter work pay.
Frohmader, D.L., *Aberdeen's magazine of masonry construction*, Nov. 1991, 4(11), p.433-435.
Cold weather construction, Masonry, Protection, Cost analysis.

46-3559
Stable and metastable phases of water adsorbed on Cu(111).
Hinch, B.J., et al, *Journal of chemical physics*, Feb. 15, 1992, 96(4), p.3262-3268, 21 refs.
Dubois, L.H.
Ice physics, Ice spectroscopy, Ice solid interface, Molecular structure, Molecular energy levels, Surface properties, Adsorption, Surface energy, Low temperature research, Stability.

46-3560
Changes in extractable phosphorus in Alberta soils during the fall-winter-spring interlude.
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Winter concreting, Concrete admixtures, Composition, Concrete curing, Temperature effects, Cold weather performance, Physical properties, Concrete freezing.

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Road maintenance, Equipment, Snow removal.

46-3566
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Cold weather operation, Road maintenance, Snow removal, Equipment.

46-3567
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46-3569
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46-3570
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Tunnels, Ground water, Subsurface investigations, Gases, Freeze thaw cycles, Frozen rocks.

46-3573
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Periodic variations, Frost heave, Soil freezing, Snow cover effect, Frozen ground mechanics, Climatic factors.

46-3574
Study on the impact of cryogenic heaving on the stability of architectural monuments in the Russian North. [Issledovanie vliianiia kriogennogo pucheniia na ustoichivost' pamiatnikov arkhitektury russkogo Severa],
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Seasonal freeze thaw, Frost heave, Soil freezing, Foundations, Engineering geology, Stability.

46-3575
SCAR report No.8, Jan. 1992.
Scientific Committee on Antarctic Research, Cambridge, Scott Polar Research Institute, 40p.
Research projects, Sea ice, Marine biology.
The first portion of this issue consists of the SCAR/SCOR Group of Specialists on Southern Ocean Ecology report of the meeting held in Trondheim, Norway, May 21-23 1990, covering the future role of the Group, the coordination between antarctic research programs, an outline draft report from the workshop on the Ecology of the Antarctic Sea-Ice Zone, and reports from sub-groups on fish and krill biology and physiology. A number of annexes and appendices in this portion present details on the subjects discussed in the above report, including a full report of the Workshop on the Ecology of the Antarctic Sea-Ice Zone, held in Trondheim May 18-21, 1990. The second portion of this issue consists of the Group of Specialists on Southern Ocean Ecology report of the meeting held in Bremerhaven, Germany, Sep. 17-18, 1991, with a review of the EASIZ Implementation Workshop and advice to SCAR on Implementation of the EASIZ Programme. Here also a number of annexes and appendices expand on the subjects dealt with in the above report, including a full report of the EASIZ Programme Implementation Workshop, held in Bremerhaven Sep. 14-16, 1990.

46-3576
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46-3577
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46-3578
Challenge of designing and operating ground-based observational instruments in alpine terrain.
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Measuring instruments, Alpine landscapes, Cold weather performance, Design criteria, Weather stations, Meteorological data, Icing, Weather observations, Sensors.

46-3579
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Plant tissues, Cold tolerance, Acclimatization, Plant physiology, Chemical properties, Freezing, Solutions, Damage.

46-3580
Pile foundation construction characteristics in the Alaska oil pipeline.
Fedorovich, D.I., et al, *Soil mechanics and foundation engineering,* Mar. 1992, 28(5), p.204-207, Translated from Osnovaniia, fundamenti i mekhanika gruntov.
Targulian, IU.O.
Pipeline supports, Foundations, Pile structures, Permafrost bases, Cold weather construction, Design criteria, Pipes (tubes), Mechanical properties, Cost analysis.

46-3581
Roughness-detection technique for objectively classifying drops and graupel in 2D-image records.
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Petersen, M.S.
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46-3582
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46-3583
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46-3584
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46-3585
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46-3586
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46-3587
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Concrete admixtures, Antifreezes.

46-3590
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Snow surveys, Snow water equivalent, Runoff forecasting, Canada—Yukon Territory.

46-3591
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Vesikari, E., *Finland. Technical Research Centre. Research reports,* 1991, No.749, 56p., In Finnish with English summary. 9 refs.
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46-3593
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46-3596
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46-3597
Documentation of historical instances of ice rubble formation and overtopping of vessels and offshore structures.
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46-3598
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46-3599
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46-3601
Hydrology of rivers of the cryolithic zone in the USSR—the present state and prospects for investigations.
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River basins, Water balance, Hydrologic cycle, Subpermafrost ground water, Soil freezing, Drainage, Water flow.

46-3602
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46-3603
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46-3604
Characteristics of weathering of basic rocks in Arctic.
Samoilov, A.G., *Soviet geology and geophysics*, 1991, 32(4), p.78-82, Translated from Geologiia i geofizika. 5 refs.
Weathering, Rock properties, Chemical composition, Decomposition, Temperature effects, Soil formation, Chemical analysis, Mineralogy, Tundra.

46-3605
Faint young sun climatic paradox: a simulation with an interactive seasonal climate-sea ice model.
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Climatic changes, Insolation, Solar radiation, Sea ice distribution, Surface temperature, Radiation balance, Ice cover effect, Carbon dioxide, Global change, Temperature variations, Simulation.

46-3606
Abrupt climatic change related to unstable ice-sheet dynamics: toward a new paradigm.
Hughes, T.J., *Global and planetary change*, Mar. 1992, 5(3), p.203-234, Refs. p.231-234.
Climatic changes, Paleoclimatology, Ice sheets, Ice air interface, Glacier oscillation, Climatic factors, Ice models, Dust, Ice volume, Global warming.
In this paper, a new paradigm is postulated in which abrupt climatic change is driven by iceberg outbursts associated with life cycles of marine ice streams, and dust storms associated with life cycles of terrestrial ice streams. For Pleistocene Northern Hemisphere ice sheets, these mechanisms regulated North Atlantic surface temperatures and salinity, and perhaps planetary albedo and atmospheric CO2, and thereby drove climatic change, which tended to be abrupt because ice-stream life cycles began and ended abruptly. A portion of these ice sheets was subjected to the unstable life cycles of ice streams, as seen in the pronounced spikiness of the late glacial oxygen isotope stratigraphy in the Greenland ice core at Dye 3. Life cycles of Greenland ice streams during the Holocene seem to be linked to episodes of regional climatic cooling; most recently, the Little Ice Age. When superimposed on the present Milankovitch hemicycle of reduced insolation over the North Atlantic, this could abruptly initiate a new worldwide glaciation cycle in the aftermath of present-day CO2 "greenhouse" warming. Proliferation of antarctic ice-stream life cycles during the period of "greenhouse" warming may also trigger global climatic change by forcing a reorganization of circumpolar thermohaline circulation in the southern ocean. (Auth. mod.)

46-3607
Simulation of vertical limnological gradients.
Rahel, F.J., *Journal of freshwater ecology*, Dec. 1989, 5(2), p.247-252, 21 refs.
Limnology, Lake water, Water temperature, Temperature gradients, Stratification, Simulation, Laboratory techniques, Ecology, Oxygen.

46-3608
Development of expert system assisting power system operators to determine deicing countermeasures against snow accretion on transmission lines.
Choi, K.H., et al, *Electrical engineering in Japan*, 1991, 111(3), p.57-68, Translated from Denki gakkai ronbunshi, 110B(8), Aug., 1990. 6 refs.
Nishiya, K.I., Hasegawa, J., Nara, K.
Transmission lines, Snow cover effect, Ice accretion, Ice removal, Countermeasures, Ice forecasting, Computer applications, Simulation.

46-3609
Does ice dissolve or does halite melt?—a low-temperature liquidus experiment for petrology classes.
Brady, J.B., *Journal of geological education*, Mar. 1992, 40(2), p.116-118, 5 refs.
Geologic processes, Education, Experimentation, Brines, Freezing points, Solutions, Liquid phases, Magma, Geochemistry.

46-3610
Measurement of bound water in excess activated sludges and effect of freezing and thawing process on it.
Matsuda, A., et al, *Journal of chemical engineering of Japan*, Feb. 1992, 25(1), p.100-103, 6 refs.
Kawasaki, K., Mizukawa, Y.
Waste treatment, Sludges, Freeze thaw cycles, Hygroscopic water, Freeze drying, Liquid solid interfaces, Water treatment, Temperature effects.

46-3611
Observed ice passage from Lake Huron into the St. Clair River.
Daly, S.F., *Journal of great lakes research*, 1992, 18(1), MP 3076, p.61-69, 8 refs.
Lake ice, River ice, Ice passing, Ice conditions, Ice forecasting, Photointerpretation, Statistical analysis, Ice jams, Surface structure, United States--St. Clair River.
Ice entering the St. Clair River from southern Lake Huron has caused large ice jams on the river, which have inundated large inhabited areas and delayed navigation. Study and forecasting of these ice jam events require that the ice passage from the lake into the river be described quantitatively. This paper analyzes data obtained from time-lapse photography of ice conditions at the entrance of the river at Lake Huron over six winters. For each day of record when ice was observed in Lake Huron or the river, the presence or absence of an ice arch and the daily average surface concentration of ice entering the river were noted. For the months of Jan. through Apr., separate means, standard deviations, and distributions of the surface ice concentration were determined for periods when the ice arch was present or absent. The existence of the ice arch can be predicted by a simple indicator based on air temperature. The statistical distributions of ice concentration are strongly influenced by the presence or absence of the ice arch. The overall mean surface ice concentration was 9.5%, with an arch present and 27.3% with no arch. Based on this finding, ice passage can be forecast.

46-3612
Functional representation of Great Lakes surface temperatures.
Lesht, B.M., et al, *Journal of great lakes research*, 1992, 18(1), p.98-107, 18 refs.
Brandner, D.J.
Lake water, Water temperature, Climatology, Surface temperature, Seasonal variations, Temperature measurement, Climatic factors, Simulation, Mathematical models, United States--Great Lakes.

46-3613
Review of Great Lakes ice research.
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Lake ice, Research projects, Bibliographies, Ice forecasting, Ice control, United States--Great Lakes.

46-3614
Snow on two-level flat roofs—measured vs. 1990 NBC loads.
Taylor, D.A., *Canadian journal of civil engineering*, Feb. 1992, 19(1), p.59-67, With French summary. 20 refs.
Roofs, Buildings, Snow loads, Standards, Snow surveys, Design criteria, Snow depth, Statistical analysis, Wind factors.

46-3615
Analysis of river ice motion near a breaking front.
Ferrick, M.G., et al, *Canadian journal of civil engineering*, Feb. 1992, 19(1), MP 3077, p.105-116, With French summary. 9 refs. For another source see 46-1871.
Weyrick, P.B., Hunnewell, S.T.
River ice, Hydrodynamics, Ice mechanics, Ice breakup, Boundary layer, Ice water interface, Dynamic properties, Wave propagation, Analysis (mathematics).
Dynamic river ice breakup displays different behaviors depending on the physical characteristics of the river, the flow, and the ice cover. Although a quantitative theory of dynamic breakup is not yet available, one of the essential components of such a theory will be a description of the ice motion near the breaking front. In this paper, an analysis of this motion for a specific case is developed. The analysis is generalized by allowing the speed of the breaking front to vary, and the parameters of the ice motion that are obtained represent different dynamic breakup behaviors that have been previously described. The results of the analysis include (i) the ice velocity, ice acceleration, and bank resistance at each point in a river reach as functions of time, (ii) the equilibrium ice velocity as a function of bank resistance and the ice velocity as a function of time for several initial and bank resistance conditions, and (iii) the time of ice motion, ice velocity, ice acceleration, and the convergence of the moving ice with distance from the breaking front. The measure of ice convergence quantifies the loss of surface area by the sheet required for ice continuity, and distinguishes the basic types of dynamic breakup.

46-3616
Angle distribution, granulometry and mobility of materials along an alpine talus slope. (Pentes, granulométrie et mobilité des matériaux le long d'un talus d'éboulis en milieu alpin),
Francou, B., *Permafrost and periglacial processes*, July-Sep. 1991, 2(3), p.175-186, In French with English summary. 41 refs.
Talus, Alpine landscapes, Slope processes, Periglacial processes, Sediment transport, Soil profiles, Statistical analysis, Mountain soils.

46-3617
Alpine permafrost temperature zonality, northern Trans-Baikal region, USSR.
Romanovskiĭ, N.N., et al, *Permafrost and periglacial processes*, July-Sep. 1991, 2(3), p.187-195, With French summary. 7 refs.
Continuous permafrost, Zero amplitude level, Soil temperature, Geocryology, Temperature inversions, Landscape types, Permafrost thickness, Altitude, Boreholes, Temperature measurement, USSR--Transbaikal.

46-3618
Observations of aeolian transport and niveo-aeolian deposition at three lowland sites, Canadian Arctic Archipelago.
Lewkowicz, A.G., et al, *Permafrost and periglacial processes*, July-Sep. 1991, 2(3), p.197-210, With French summary. 42 refs.
Young, K.L.
Periglacial processes, Eolian soils, Wind erosion, Snow cover effect, Sediment transport, Soil erosion, Seasonal variations, Slope processes, Canada—Ellesmere Island.

46-3619
Ice-wedge casts of Wisconsinan age in eastern Nebraska.
Wayne, W.J., *Permafrost and periglacial processes*, July-Sep. 1991, 2(3), p.211-223, With French summary. 68 refs.
Continuous permafrost, Wind factors, Pleistocene, Patterned ground, Periglacial processes, Permafrost indicators, Ice wedges, Glaciation, Soil analysis, Paleoclimatology, Geocryology.

46-3620
Localization, genesis and thawing of several naleds in the northern Yukon (Canada). [Localisation, genèse et fonte de quelques naleds du nord du Yukon (Canada)].
Lauriol, B., et al, *Permafrost and periglacial processes*, July-Sep. 1991, 2(3), p.225-236, In French with English summary. 30 refs.
Cinq-Mars, J., Clark, I.D.
Naleds, Bedrock, Ground water, Icing, Periglacial processes, Geocryology, Drainage, Isotope analysis, Rivers.

46-3621
Ploughing blocks of the Tien Shan.
Gorbunov, A.P., *Permafrost and periglacial processes*, July-Sep. 1991, 2(3), p.237-243, With French summary. 10 refs.
Slope processes, Rocks, Periglacial processes, Soil erosion, Geocryology, Snow cover effect, Frozen ground mechanics, Seasonal freeze thaw, Frozen rocks, Geomorphology, USSR—Tien Shan.

46-3622
Age of growth of two pingos, Sarqaq Dalen, west central Greenland.
Yoshikawa, K., *Permafrost and periglacial processes*, July-Sep. 1991, 2(3), p.245-252, With French summary. 23 refs.
Pingos, Permafrost dating, Palynology, Periglacial processes, Continuous permafrost, Marine geology, Permafrost physics, Geomorphology, Ground ice, Pleistocene, Greenland—Disko Island.

46-3623
Changes to the permafrost environment after forest fire, Da Xi'an Ridge, Gu Lian mining area, China.
Liang, L.H., et al, *Permafrost and periglacial processes*, July-Sep. 1991, 2(3), p.253-257, With French summary. 4 refs.
Zhou, Y.W., Wang, J.C.
Permafrost transformation, Thermal regime, Forest fires, Damage, Thaw depth, Soil analysis, Environmental impact, Revegetation, Physical properties.

46-3624
Permafrost and ground ice conditions reported during recent geotechnical investigations in the Mayo District, Yukon Territory.
Burn, C.R., *Permafrost and periglacial processes*, July-Sep. 1991, 2(3), p.259-268, With French summary. 39 refs.
Discontinuous permafrost, Ground ice, Permafrost thickness, Boreholes, Permafrost distribution, Subsurface structures, Engineering geology, Geocryology, Geophysical surveys, Canada—Yukon Territory.

46-3625
Weathering stage of till and glacial history of the central Sör Rondane Mountains, East Antarctica.
Moriwaki, K., et al, NIPR Symposium on Antarctic Geosciences, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1991, p.99-111, 20 refs.
Hirakawa, K., Matsuoka, N.
Ice sheets, Glacial deposits, Weathering, Glaciation, Ice cover thickness, Antarctica—Sör Rondane Mountains.
The Sör Rondane Mountains are in some places covered with tills which show various degrees of weathering. According to the degree of weathering, tills are classified into 5 exposure stages (relative ages). On the basis of height and age data of tills, the glacial history in the central Sör Rondane is constructed as follows: a large part of the mountains was once covered with an ice sheet (prior to 4 Ma); the ice sheet retreated intermittently prior to 1 Ma; in the first half of the last one million years, the ice sheet was stagnant or re-advanced, forming lateral moraines in some places, and the ice sheet surface was about 100 m higher than at present. Since then, the ice sheet has retreated to a level somewhat higher than at present. (Auth. mod.)

46-3626
Snow fence guide.
Tabler, R.D., *National Research Council. Strategic Highway Research Program*, 1991, SHRP-W/FR-91-106, 61p., A 21-min VHS video cassette, "Effective snow fences," is also available as a supplement.
Snow fences, Road maintenance, Blowing snow, Snowdrifts, Protective vegetation, Forest strips.

46-3627
Total organic carbon in the sea-ice zone between Elephant Island and the South Orkney Islands at the start of the austral summer (1988-89).
Prego, R., *Marine chemistry*, Nov. 1991, 35(1-4), Symposium on Biochemistry and Circulation of Water Masses in the Southern Ocean, July 1990. Proceedings. Edited by P. Tréguer and B. Quéguiner, p.189-197, 17 refs.
Sea water, Chemical composition, Hydrography, Sea ice, Antarctica—Elephant Island, Antarctica—South Orkney Islands.
During an antarctic survey carried out on board on R/V *Professor Siedlecki* (26 Dec. 1988-18 Jan. 1989) seawater samples were collected from nine depths, from the surface to 150 m, at 29 stations near the pack-ice in a zone of the Weddell-Scotia Confluence between Elephant I. and the South Orkney Is. The samples were analyzed for total organic carbon (TOC) and silicate concentrations. The two main water masses in the sampling area, coming from the Drake Passage and Weddell Sea, are well-defined, using silicate as a tracer. The concentrations of TOC are higher than 100 *micro*M and are associated with low silicate concentrations. However, in the deep water influenced by the Weddell Sea the concentrations of TOC are about 30 *micro*M. (Auth.)

46-3628
Modelling carbon cycling through phytoplankton and microbes in the Scotia-Weddell Sea area during sea ice retreat.
Lancelot, C., et al, *Marine chemistry*, Nov. 1991, 35(1-4), Symposium on Biochemistry and Circulation of Water Masses in the Southern Ocean, July 1990. Proceedings. Edited by P. Tréguer and B. Quéguiner, p.305-324, 35 refs.
Sea ice, Plankton, Microbiology, Models, Antarctica—Weddell Sea, Scotia Sea.
An ecological model to calculate phytoplankton development and microbial loop dynamics in the marginal ice zone of the antarctic ecosystem has been established on the basis of physical and biological measurements carried out in the marginal ice zone of the Scotia-Weddell Sea sector of the southern ocean during sea ice retreat 1988 (EPOS 1 and 2 expeditions). Application of this model at latitudes where sea ice retreat occurs and in adjacent open sea and permanently ice-covered areas demonstrated that the marginal ice zone is a region of enhanced primary and bacterioplankton production. Combining the results of the phyto- and bacterioplankton models allowed the quantitative estimate of the carbon fluxes through the lower level of the planktonic food web of the Weddell Sea marginal ice zone during the sea ice retreat period. The resulting carbon budget revealed the quantitative importance of microbial and micrograzing processes in the pathways of net primary production, 71% of this latter being assimilated in the microbial food web. However, total net microbial food web secondary production contributed 28% of 'marginal ice zone-produced' food resources available to krill and other zooplankton. (Auth.)

46-3629
Regional relationships between biological and hydrographical properties in the Weddell Gyre in late austral winter 1989.
Nöthig, E.M., et al, *Marine chemistry*, Nov. 1991, 35(1-4), Symposium on Biochemistry and Circulation of Water Masses in the Southern Ocean, July 1990. Proceedings. Edited by P. Tréguer and B. Quéguiner, p.325-336, 39 refs.
Sea ice, Hydrography, Plankton, Antarctica—Weddell Sea.
The surface layer properties of the Weddell Gyre were measured during a cruise of the R/V *Polarstern* in Sep. and Oct. 1989 on a transect between the tip of the Antarctic Peninsula and Cape Norvegia. Sea ice cover, hydrography, and the distribution of inorganic nutrients and dissolved oxygen represented late winter conditions: a quasi-homogeneous Winter Water layer with near-freezing temperatures, high salinities and high levels of nitrate, and undersaturated with dissolved oxygen. The area investigated could be divided into three regions based on the physical, chemical and biological patterns: the western and eastern flanks and the gyre interior. In all areas, autotrophic biomass in sea ice was high in comparison with the underlying water column. Within the sea ice mainly diatoms and dinoflagellates were present, while the dominant autotrophic organisms in the water column were nanoflagellates. Ammonium values were relatively high in the Winter Water layer in the central region, indicating heterotrophic activity. Mesozooplankton was dominated by copepods, which can in turn be divided into two groups: overwintering, inactive *Calanus acutus* were found in the Warm Deep Water, whereas actively feeding *Calanus propinquus* were most abundant in the upper 120 m of the water column under the sea ice in the central region. These spatial differences may influence development of the respective summer pelagic communities (Auth.)

46-3630
Dimethylsulfoniopropionate (DMSP) in ice algae and its possible biological role.
Kirst, G.O., et al, *Marine chemistry*, Nov. 1991, 35(1-4), Symposium on Biochemistry and Circulation of Water Masses in the Southern Ocean, July 1990. Proceedings. Edited by P. Tréguer and B. Quéguiner, p.381-388, 27 refs.
Sea ice, Algae, Ice composition.
During the EPOS 1 expedition (leg 1, 1988) into the Weddell Sea the dimethylsulfoniopropionate (DMSP) contents of various ice-algal assemblages and phytoplankton populations in the open water and in the ice edge zones were investigated. The chlorophyll *a* content in the ice samples was 25-70 times higher than that of the open water column, and about 100-390 more than in the under-ice water column. The DMSP content in ice-algae was about 20-56 times higher than in the open water, and 107-245 than in the under-ice water. There was no strict (linear) correlation between pigment content and DMSP concentration, although high chlorophyll values were always accompanied by high DMSP content. The variability of DMSP data can be explained by variation in species composition. Especially high concentrations were observed in samples where *Phaeocystis pouchetii* was present. In ice DMSP may have a twofold biological role: as an osmolyte and/or as a cryoprotectant (antifreeze). (Auth.)

46-3631
Modelling ice sheet dynamics.
Fowler, A.C., *Geophysical and astrophysical fluid dynamics*, Feb. 1992, 63(1-4), p.29-65, 53 refs.
Ice sheets, Ice models, Glacier flow, Viscous flow, Thermal conductivity, Heating, Mathematical models, Ice temperature, Basal sliding.

46-3632
Mars: where the sky is falling.
Dyer, A., *Weatherwise*, Dec. 1991-Jan. 1992, 44(6), p.31-35.
Mars (planet), Planetary environments, Extraterrestrial ice, Atmospheric composition, Meteorological factors, Climatic factors, Weather observations.

46-3633
Effect of freezing-thawing on lipid peroxidation in chlorophyll-containing plant tissues.
Matorin, D.N., et al, *Soviet plant physiology*, Dec. 1991, 38(3)Pt.2, p.401-406, Translated from *Fiziologiia rastenii*. 20 refs.
Vavilin, D.V., Kafarov, R.S., Venediktov, P.S.
Plant tissues, Photosynthesis, Cold tolerance, Luminescence, Freeze thaw tests, Damage, Temperature effects, Light effects.

46-3634
Proton magnetic resonance of water with changes of hydration in trees during winter.
Manuil'skiĭ, V.D., et al, *Soviet plant physiology*, Dec. 1991, 38(3)Pt.2, p.407-412, Translated from *Fiziologiia rastenii*. 19 refs.
Trees (plants), Plant physiology, Plant tissues, Cold tolerance, Frost resistance, Freeze thaw tests, Water transport, Mathematical models, Proton transport, Supercooling.

46-3635
Effect of temperature on photosynthesis and carbon metabolism in related plant species of the arctic tundra of Wrangel Island and the Central Urals.
P'iankov, V.I., *Soviet plant physiology*, Mar. 1992, 38(5)Pt.1, p.607-613, Translated from *Fiziologiia rastenii*. 23 refs.
Plant physiology, Plant tissues, Tundra, Cold tolerance, Photosynthesis, Temperature effects, Carbon dioxide, Plant ecology, Chemical properties.

46-3636
Regional apportionment of sulfate and tracer elements in Rhode Island precipitation.
Heaton, R.W., et al, *Atmospheric environment*, June 1992, 26A(8), p.1529-1543, 23 refs.
Rahn, K.A., Lowenthal, D.H.
Precipitation (meteorology), Air pollution, Atmospheric circulation, Snow composition, Snow impurities, Chemical properties, Aerosols, Scavenging, Environmental impact, Sampling, United States—Rhode Island.

46-3637
Surface albedo measurements at 53N latitude.
Angle, R.P., et al, *Atmospheric environment*, June 1992, 26A(8), p.1545-1547, 17 refs.
Brennand, M., Sandhu, H.S.
Albedo, Air pollution, Surface energy, Snow cover effect, Photochemical reactions, Solar radiation, Ozone, Climatic factors, Seasonal variations.

46-3638
Hard road to Yamal.
Kurnosov, M., *Soviet shipping*, 1988, 8(3), p.34-35.
Marine transportation, Cold weather operation, Logistics, Ice cover effect, Icebreakers, USSR—Yamal Peninsula.

46-3639
Arctic navigation: problems of two seaways.
Young, O.R., *Soviet shipping*, 1991, No.3, p.35-37.
Marine transportation, Cold weather operation, International cooperation, Human factors, Economic analysis, Arctic Ocean.

46-3640
Sorption of metribuzin and metolachlor in Alaskan subarctic agricultural soils.
Graham, J.S., et al, *Weed science*, Jan.-Mar. 1992, 40(1), p.155-160, 27 refs.
Conn, J.S.
Soil chemistry, Organic soils Soil pollution, Leaching, Soil temperature, Subarctic landscapes, Adsorption, Temperature effects, Vegetation factors, Agriculture.

46-3641
Sea ice thickness distribution in the Greenland Sea and Eurasian Basin, May 1987.
Wadhams, P., *Journal of geophysical research*, Apr. 15, 1992, 97(C4), p.5331-5348, 37 refs.
Sea ice, Ice cover thickness, Subglacial observations, Ice bottom surface, Ocean currents, Acoustic measurement, Distribution, Oceanographic surveys, Statistical analysis, Greenland Sea.

46-3642
Interannual variability of monthly southern ocean ice distribution.
Parkinson, C.L., *Journal of geophysical research*, Apr. 15, 1992, 97(C4), p.5349-5363, 27 refs.
Sea ice distribution, Radiometry, Spaceborne photography, Sensor mapping, Seasonal variations, Climatic changes, Microwaves.
The region of the southern ocean exhibiting interannual variability in monthly averaged sea ice distributions has been mapped and analyzed, using data from the Nimbus 5 Electrically Scanning Microwave Radiometer (ESMR) and the Nimbus 7 Scanning Multichannel Microwave Radiometer (SMMR). Over the 13-year record from the two instruments, interannual variability is particularly high for the early summer month of Dec. This area of Dec. variability is almost three times the ocean area consistently having ice-covered conditions in the 13 ESMR/SMMR Decembers. In contrast, in mid-winter the area of consistent ice coverage far exceeds the area of variability, which, in spite of the much greater ice coverage overall, is not as large as the area of variability in Dec. The mid-winter variability is confined to (1) a ring of variable width around the edge of the ice pack and (2) the location of the 1974-1976 Weddell polynya. The images and plots provide a succinct summary of the range of spatial distributions of southern ocean sea ice during the ESMR and SMMR time periods. They can hence be used as a convenient base for comparisons with future sea ice distributions in the effort to identify occurrences of climate change. (Auth. mod.)

46-3643
Turbulent heat flux in the upper ocean under sea ice.
McPhee, M.G., *Journal of geophysical research*, Apr. 15, 1992, 97(C4), p.5365-5379, 25 refs.
Sea ice, Subglacial observations, Ice cover effect, Turbulent diffusion, Ice heat flux, Ice water interface, Ocean currents, Water temperature, Turbulent boundary layer, Analysis (mathematics).

46-3644
Low-frequency vibrational motion of arctic pack ice.
Dugan, J.P., et al, *Journal of geophysical research*, Apr. 15, 1992, 97(C4), p.5381-5388, 25 refs.
DiMarco, R.L., Martin, W.W.
Sea ice, Air ice water interaction, Pack ice, Vibration, Low frequencies, Wave propagation, Velocity measurement, Acoustic measurement, Spectra.

46-3645
Modeling deep convection in the Greenland Sea.
Häkkinen, S., *Journal of geophysical research*, Apr. 15, 1992, 97(C4), p.5389-5408, 36 refs.
Mellor, G.L., Kantha, L.H.
Ocean currents, Convection, Ice water interface, Sea ice, Upwelling, Water temperature, Ice cover effect, Mathematical models, Turbulent exchange.

46-3646
Studies on the nutrient status in sea ice and underlying platelet layer of McMurdo Sound.
Arrigo, K., et al, *Antarctic journal of the United States*, 1990, 25(5), p.185-188, 10 refs.
Dieckmann, G., Gosselin, M., Sullivan, C.W.
Biomass, Microbiology, Cryobiology, Sea ice, Algae, Ice composition, Antarctica—McMurdo Sound.
To better understand the development and growth of the sea-ice microbial community, the nutrient environment of the platelet ice and the upper water column were studied in McMurdo Sound between Sep. 26 and Dec. 3, 1989. A new sampling device, ADONIS—inserted into a hole drilled into the ice—and its operating method are described. It is pointed out that the method provides valuable qualitative information on microalgal distributions within the platelet layer. Judging from spectral irradiance and from chlorophyll and inorganic nutrient profiles, it was determined that the distributions of algae in the platelet ice appear to be controlled by light, not by nutrient availability. It was noted that in the upper platelet ice, nitrate is depleted in the presence of high ammonium concentrations.

46-3647
Temperature dependence of the photosynthetic parameter alpha in antarctic sea-ice microalgae.
Robinson, D.H., et al, *Antarctic journal of the United States*, 1990, 25(5), p.188-191, 7 refs.
Sullivan, C.W.
Cryobiology, Microbiology, Algae, Photosynthesis, Antarctica—McMurdo Sound.
To characterize the temperature dependence of alpha (linear portion of the photosynthesis-irradiance curve) and, through a systematic approach, to identify the temperature sensitive steps responsible for the observed effect, fresh samples of sea-ice microalgae, collected from beneath approximately 2 m of congelation ice at McMurdo Sound during the 1988-1990 field seasons, were analyzed. The temperature sensitivity of alpha appears to be at a site affecting the measured values of quantum yield. It is suggested that the temperature sensitivity of alpha may be only an apparent change, caused by overlaying carbon fixation from the light-independent beta-carboxylation pathway onto the light-dependent reductive pentose phosphate pathway.

46-3648
Bacterioplankton abundance and productivity at the ice-edge zone of McMurdo Sound, Antarctica.
Gustafson, D.E., Jr., et al, *Antarctic journal of the United States*, 1990, 25(5), p.191-193, 15 refs.
Anderson, M.R., Rivkin, R.B.
Bacteria, Biomass, Ice edge, Plankton, Marine biology, Antarctica—McMurdo Sound.
The distribution of bacterioplankton and phytoplankton at the ice edge during the late spring and early summer, prior to the delivery of *Phaeocystis* sp. into McMurdo Sound, is discussed. Vertical profiles of planktonic biomass, collected during late Oct. and late Nov. 1989 at 4 stations along an east-west transect at the ice edge, are presented in figures. At all stations, the distribution of bacteria was vertically uniform within the upper 100 m. Bacterial abundance and productivity increased over the season. On an areal basis, phytoplankton biomass was 5 to 15 times greater than bacterial biomass.

46-3649
Fate of bacterial production in McMurdo Sound in the austral spring.
Anderson, M.R., et al, *Antarctic journal of the United States*, 1990, 25(5), p.193-194, 11 refs.
Rivkin, R.B., Gustafson, D.E., Jr.
Bacteria, Cryobiology, Antarctica—McMurdo Sound.
As part of a project examining the nutrition of planktotrophic echinoderm larvae, the abundance and production of potential prey for the larvae were measured in McMurdo Sound. Because bacteria may provide an important source of food, their division rates during the spring, and the potential loss to bacterivores, were calculated at a site 8 km north of Hut Point. Results show that bacterioplankton were relatively constant throughout the study period. Bacterial abundances showed no seasonal trend, although the bacteria were actively growing throughout the spring. Division rates ranged from 0.1 to 1.1 doublings per day; the average division rate was 0.6 doublings per day. It is concluded that grazing by bacterivores must be responsible for maintaining bacterial abundances relatively constant.

46-3650
Seasonal pattern of bacteria and net nano- and picophytoplankton in McMurdo Sound, Antarctica, during the austral spring.
Rivkin, R.B., et al, *Antarctic journal of the United States*, 1990, 25(5), p.195-196, 12 refs.
Anderson, M.R., Gustafson, D.E., Jr.
Bacteria, Plankton, Cryobiology, Biomass, Antarctica—McMurdo Sound.
As part of a multidisciplinary study of nutrition of planktotrophic echinoderm larvae in McMurdo Sound, the distribution and abundance of bacteria and several size classes of phytoplankton are reported in this article. It is found that the abundance of potential prey for planktotrophic echinoderm larvae in McMurdo Sound during the study period was low, and that approximately 60% of the chlorophyll *a* was less than 10 microns. Seasonal patterns of bacteria and chlorophyll *a* and phaeopigments in the plankton during the period from Sep. to Dec. 1989 are shown in figures.

46-3651
Flagellate- and ciliate-dominated microbial community in the land-fast ice.
Stoecker, D.K., et al, *Antarctic journal of the United States*, 1990, 25(5), p.197-199, 7 refs.
Buck, K.R., Putt, M.
Cryobiology, Sea ice, Microbiology, Antarctica—McMurdo Sound.
A unique flagellate and ciliate-dominated sea-ice microbial community, in the brine channels and pockets of the upper congelation ice during the late spring and early summer in eastern McMurdo Sound, is described. The community characteristics are presented in a table; scanning electron micrographs of critically point-dried organisms are shown. It is believed that the upper ice brine community in the land-fast ice at McMurdo will be an excellent model system in which to investigate the adaptations of sea ice microorganisms to transitions between planktonic and ice-bound existence.

46-3652
Seasonal changes in cell size and abundance of bacterioplankton during the *Phaeocystis* sp. bloom in McMurdo Sound.
Putt, M., et al, *Antarctic journal of the United States*, 1990, 25(5), p.199-201, 8 refs.
Börsheim, K.Y., Miceli, G., Stoecker, D.K.
Cryobiology, Bacteria, Biomass, Antarctica—McMurdo Sound.

46-3653
Estimation of cold hardiness of Douglas-fir and Engelmann spruce seedlings by differential thermal analysis of buds.
Tinus, R.W., et al, *Annals of applied biology*, Apr. 1985, 106(2), p.393-397, 8 refs.
Bourque, J.E., Wallner, S.J.
Trees (plants), Freeze thaw tests, Cold tolerance, Plant tissues, Freezing points, Thermal analysis, Temperature effects, Revegetation.

46-3654
How hardy trees survive winter.
Tinus, R.W., *World & I*, Jan. 1988, 3(1), p.198-199.
Trees (plants), Cold weather survival, Cold tolerance, Damage, Plant physiology, Supercooling.

46-3655
Simple method for evaluating whole-plant cold hardiness.
Rietveld, W.J., et al, *Tree planters' notes*, 1987, 38(2), p.16-18, 4 refs.
Tinus, R.W.
Trees (plants), Cold tolerance, Freeze thaw tests, Damage, Temperature effects, Laboratory techniques, Plants (botany).

46-3656
Harvest the snow.
Eftink, B., *Successful farming*, Feb. 1989, 87(2), p.60.
Water storage, Snow retention, Snowdrifts, Snow fences, Design, Wind factors, Agriculture.

46-3657
Contribution of glaciology to the All-Union and international programs on environmental studies. [Vklad gliatsiologii vo Vsesoiuznye i mezhdunarodnye programmy izucheniia okruzhaiushchel sredy].
Kotliakov, V.M., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.5-10, In Russian with English summary.
Glaciology, Global change, Research projects, Ecology.

46-3658
Some results of a scientific-statistical analysis of glaciological science in the USSR. [Nekotorye rezul'taty naukometricheskogo analiza gliatsiologicheskoĭ nauki v SSSR].
Kvon, IA.D., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.10-16, In Russian with English summary. 11 refs.
Glaciology, Research projects, Data processing.

46-3659
Snow and ice phenomena and their possible role in the formation of atmospheric CO2. [Snezhno-ledovye iavleniia i ikh vozmozhnaia rol' v formirovanii atmosfernogo CO2].
Losev, K.S., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.16-21, In Russian with English summary. 5 refs.
Glaciers, Carbon dioxide, Snow cover effect, Sea ice, Ice air interface, Snow air interface.

46-3660
Ice ages, carbon dioxide, and the Milankovich astronomical hypothesis. [Lednikovye periody, uglekislyĭ gaz i astronomicheskaia gipoteza Milankovicha].
Verbitskiĭ, M.IA., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.21-25, In Russian with English summary. 7 refs.
Chalikov, D.V.
Carbon dioxide, Paleoclimatology, Climatic changes, Mathematical models, Ice cover effect, Air ice water interaction.

46-3661
Occurrence and development of mountain glacier systems (statistical modelling). [Vozniknovenie i razvitie gornykh lednikovykh sistem (statisticheskoe modelirovanie)],
Glazyrin, G.E., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.26-31, In Russian with English summary. 9 refs.
Mountain glaciers, Mathematical models, Glacier formation, Glacier oscillation, River basins.

46-3662
Development of a concept of external mass exchange in glacier systems: from a glacier to a glacier system. [Razvitie predstavlenii o vneshnem massoobmene lednikovykh sistem: ot lednika k lednikovoi sisteme],
Diurgerov, M.B., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.31-38, In Russian with English summary. 16 refs.
Mikhalenko, V.N.
Glacier mass balance, Glacier alimentation, Glacier oscillation, Glacier ablation.

46-3663
Hydrological regime of glaciers during the evolution of glaciation. [Gidrologicheskii rezhim lednikov v usloviiakh evoliutsii oledeneniia],
Konovalov, V.G., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.38-43, In Russian with English summary. 4 refs.
Glacial hydrology, Glacier oscillation, Glacier tongues, Glacier ablation, Glacier alimentation, River basins, Analysis (mathematics).

46-3664
Role of snow cover melting in the formation of the temperature field above continents. [Rol' taianiia snezhnogo pokrova v formirovanii temperaturnogo polia nad kontinentami],
Krenke, A.N., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii, May 1989, Vol.66, p.43-51, In Russian* with English summary. 10 refs.
Loktionova, E.M.
Snow cover effect, Snow melting, Heat balance, Snow air interface.

46-3665
Multidisciplinary glaciological studies in Svanetia in 1986. [Kompleksnye gliatsiologicheskie issledovaniia v Svanetii v 1986 godu],
Serebriannyi, L.R., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.52-59, In Russian with English summary. 3 refs.
Orlov, A.V., Gobedzhishvili, R.G., Tareeva, A.M.
Glacier formation, Glacier oscillation, Glacier tongues, Glacier thickness, Glacier melting, Glacier ice, Glacier ablation.

46-3666
Characteristics of the formation of natural disasters in Georgia in 1987. [Osobennosti formirovaniia stikhiinykh iavlenii v Gruzii v 1987 g.],
Svanidze, G.G., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.60-65, In Russian with English summary.
Avalanches, Records (extremes), Snowfall, Snow depth.

46-3667
Mass transfer of glaciers in the Caucasus. [Massoobmen lednikov Kavkaza],
Tsomaia, V.Sh., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.66-70, In Russian with English summary. 1 ref.
Aliev, I.A.
Glacier mass balance, Glacier tongues, Glacial hydrology, Glacier ablation, Mass transfer, Glacier oscillation.

46-3668
Resources of snow and glacial meltwaters in the Caucasus. [Resursy talykh snegovykh i lednikovykh vod Kavkaza],
Vladimirov, L.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.70-73, In Russian with English summary. 6 refs.
Dzhavakhishvili, A.I., Zakarashvili, N.N.
Snowmelt, Snow melting, Glacier melting, Runoff, Snow hydrology, Glacial hydrology.

46-3669
Water balance of basins of small glacial rivers in the Greater Caucasus. [Vodnyi balans basseinov malykh lednikovykh rek Bol'shogo Kavkaza],
Shengeliia, R.G., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.73-79, In Russian with English summary. 22 refs.
Glacial rivers, Water balance, River basins, Hydrology, Snow melting, Glacier melting, Meltwater, Runoff.

46-3670
Glacial runoff of the Sary-Dzhaz River in Central Tien Shan. [Lednikovyi stok r.Sary-Dzhaz v Tsentral'nom Tian'-Shane],
Dikikh, A.N., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.79-85, In Russian with English summary. 11 refs.
Dikikh, L.L.
Runoff, Glacial rivers, Glacier melting, Snow melting.

46-3671
Changes in meteorological characteristics in the regime of the Abramov Glacier and the runoff in its basin. [Izmeneniia meteorologicheskikh kharakteristik, rezhima lednika Abramova i stoka v ego basseine],
Adzhiumerov, N.R., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.85-93, In Russian with English summary. 12 refs.
Glacial meteorology, Runoff, Mass transfer, Glacier ablation, Glacier mass balance, Climatic factors, Cloud cover.

46-3672
Characteristics of glacier development under conditions of active volcanism. [Osobennosti razvitiia lednikov v usloviiakh aktivnogo vulkanizma],
Vinogradov, V.N., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.93-99, In Russian with English summary. 10 refs.
Murav'ev, IA.D.
Volcanoes, Glacier oscillation, Moraines, Glacier ice, Ice composition.

46-3673
Zonal features of glacial climate, ice formation and runoff from glaciers in Central Altay. [Zonal'nye osobennosti lednikovogo klimata, l'doobrazovaniia i stoka s lednikov v Tsentral'nom Altae],
Narozhnyi, IU.K., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.99-105, In Russian with English summary. 12 refs.
Glacial meteorology, Runoff, Glacier melting, Ice formation, Firn stratification, Glacier surveys.

46-3674
Thickness of mountain glaciers: methods of calculation, resultant errors, and ways of reducing them. [Tolshchina gornykh lednikov: raschetnye metody opredeleniia, voznikaiushchie oshibki i puti ikh umen'sheniia],
Nikitin, S.A., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.105-108, In Russian with English summary. 8 refs.
Osipov, A.V.
Glacier thickness, Glacier surveys, Analysis (mathematics), Radio echo soundings, Accuracy.

46-3675
Using radar to study the structure of snow-firn sequence. [Opyt ispol'zovaniia radiolokatora dlia izucheniia stroeniia snezhno-firnovoi tolshchi],
Gromyko, A.N., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.108-116, In Russian with English summary. 9 refs.
Vasilenko, E.V., Macheret, IU.IA., Moskalevskii, M.IU.
Radio echo soundings, Firn stratification, Electromagnetic properties, Glacier alimentation, Wave propagation, Analysis (mathematics).

46-3676
Climatic variability of sea ice in the Arctic Ocean based on data from mathematical modelling. [Klimaticheskaia izmenchivost' morskikh l'dov Severnogo Ledovitogo okeana po dannym matematicheskogo modelirovaniia],
Appel', I.L., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.116-120, In Russian with English summary. 16 refs.
Gudkovich, Z.M., Petrov, V.M.
Air ice water interaction, Sea ice, Climatic factors, Mathematical models, Ice cover.

46-3677
Fluctuations in ice conditions and properties of snow cover in the Western Arctic. [Kolebaniia ledovitosti i kharakteristik snezhnogo pokrova v Zapadnoi Arktike],
Briazgin, N.N., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.121-126, In Russian with English summary. 13 refs.
Voskresenskii, A.I., Dement'ev, A.A.
Snow cover, Ice cover, Solar radiation, Sea ice, Seasonal variations.

46-3678
Stable accumulations of ice in the World Ocean. [Ustoichivye skopleniia l'da v Mirovom okeane],
Smirnov, V.I., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.127-132, In Russian with English summary. 15 refs.
Sea ice, Pack ice, Ice cover thickness, Snow depth.

46-3679
Principles of logistics and provision of scientific information in the prevention of naleds. [Printsipy organizatsii i nauchno-informatsionnoe obespechenie bor'by s nalediami],
Alekseev, V.R., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii, May 1989, Vol.66, p.133-138, In Russian with English* summary. 20 refs.
Naleds, Countermeasures, Icing, Ice detection.

46-3680
Determining the turbulent fluxes of sensible and latent heat from gradient observations data during glacial inversions. [Ob opredelenii turbulentnykh potokov iavnogo i skrytogo tepla po dannym gradientnykh nabliudenii v usloviiakh lednikovykh inversii],
Arapov, P.P., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.138-142, In Russian with English summary. 8 refs.
Krigel', A.M., Morachevskii, V.G.
Thermodynamics, Latent heat, Heat flux, Turbulent flow, Phase transformations, Analysis (mathematics), Ice surface, Glacier surfaces.

46-3681
Antifreeze-thermal core drilling in arctic ice sheets. [Antifriz-termicheskoe kernovoe burenie arkticheskikh pokrovnykh lednikov],
Zagorodnov, V.S., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.143-149, In Russian with English summary. 5 refs.
Antifreezes, Boreholes, Ice coring drills, Thermal drills, Ice cores, Drilling fluids, Glaciers.

46-3682
Approximate analysis of a core taken to study the structure and temperature regime of the Austfonna. [Ekspress-analiz kerna dlia izucheniia stroeniia i temperaturnogo rezhima vostochnogo ledianogo polia],
Zagorodnov, V.S., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.149-158, In Russian with English summary. 15 refs.
Arkhipov, S.M.
Ice cores, Drill core analysis, Boreholes, Ice density, Ice electrical properties, Electrical resistivity, Climatic factors, Ice temperature, Ice composition.

46-3683
Attributes of avalanche forecasting. [Atributy prognoz lavin],
Kanaev, L.A., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, May 1989, Vol.66, p.159-164, In Russian. 19 refs.
Avalanche forecasting, Analysis (mathematics).

46-3684
Morphology of ice-catchments in Antarctica. [Morfologiia ledosbornykh basseinov Antarktidy].
Glazovskiĭ, A.F., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.165-168, In Russian with English summary. 2 refs.
Zakharov, V.G.
Glacier alimentation, Glacier mass balance, Glacier ice, Ice accretion, Ice volume.
Data were used to arrange the ice basins of Antarctica according to their marine/terrestrial portion ratios, and to compare the results of this ranging with the ice discharge rate. Three types of glacier basins were distinguished: marine, transitional, and terrestrial. They were recognized by means of ice volume ratio. This ratio was estimated as the ice volume on the bedrock above sea level divided by the ice volume on the bedrock below sea level in each basin. The volume ratio for marine type basins varied from 0.7:10 to 2:10, for transitional type from 8:10 to 27:10, and for terrestrial type from 146:10 to 249:10. Specific ice discharge through a unit width of catchment margin was highest in marine basins. This is 2-3 times higher than in transitional basins, and 10-25 times higher than in terrestrial basins. (Auth. mod.)

46-3685
Meteorological conditions in the area of Adishi Glacier in the summer of 1986. [Meteorologicheskie usloviia v raĭone lednika Adishi letom 1986 g.].
Tareeva, A.M., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.168-172, In Russian with English summary. 6 refs.
Karalashvili, T.V.
Glacial hydrology, Glacial meteorology, Wind velocity, Glacier surveys.

46-3686
Katabatic wind and its effect on air temperature distribution in the Adishi Mountain Glacier basin during a period of ablation. [Stokovyĭ veter i ego vliianie na raspredelenie temperatury vozdukha v gorno-lednikovom basseĭne Adishi v period abliatsii].
Loktionova, E.M., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.173-181, In Russian with English summary. 7 refs.
Glacial meteorology, Glacier ablation, Wind velocity, Air temperature, Temperature distribution, Temperature gradients, Wind (meteorology).

46-3687
Thermal evidence of pollution in snow cover. [Teplovoe proiavlenie zagriazneniia snezhnogo pokrova].
Khodakov, V.G., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.181-185, In Russian with English summary. 8 refs.
Il'ina, E.A., Sosnovskiĭ, A.V.
Snow impurities, Snow thermal properties, Snow melting, Mathematical models, Snow cover.

46-3688
Evaluating the accuracy of avalanche velocity estimations in the deceleration zone. [K otsenke tochnosti opredeleniia skorosti laviny na uchastke tormozheniia].
Andreev, IU.B., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.185-187, In Russian with English summary. 2 refs.
Bozhinskiĭ, A.N.
Avalanche mechanics, Mathematical models, Velocity, Accuracy, Avalanche forecasting.

46-3689
Destructive long-distance effects of avalanche air waves. [O razrushitel'nom dal'nodeĭstvii vozdushnoĭ volny lavin].
Akif'eva, K.V., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.187-191, In Russian with English summary. 3 refs.
Bozhinskiĭ, A.N., Rodionovskiĭ, M.V., Sukhanov, L.A.
Avalanche mechanics, Avalanche wind, Avalanche modeling.

46-3690
Regional genetic classification of naleds. [Regional'naia geneticheskaia klassifikatsiia naledeĭ].
Rivkin, F.M., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.192-195, In Russian with English summary. 8 refs.
Naleds, Icing, Classifications, Ice accretion, Water balance.

46-3691
Symposium on glaciotectonics in Poland. [Simpozium po gliatsiotektonike v Pol'she].
Grosval'd, M.G., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.195, In Russian.
Meetings, Tectonics, Glacial geology.

46-3692
Isotope-oxygen composition of ground ice. [Izotopno-kislorodnyĭ sostav podzemnykh l'dov].
Vasil'chuk, IU.K., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.196-210, In Russian with English summary. 48 refs.
Oxygen isotopes, Ice composition, Ground ice, Pleistocene, Geocryology, Ice wedges, Isotope analysis.

46-3693
Soviet glaciological studies in 1988. [Sovetskie gliatsiologicheskie issledovaniia v 1988 godu].
Kotliakov, V.M., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.211-221, In Russian.
Solomina, O.N.
Research projects, Glaciology, Glaciers, Snow cover, Avalanches, Ice composition, Mathematical models, Engineering geology, Ground ice, Ice physics, Snow composition, Antarctica.
This article is a listing, with brief descriptions, of 1988 Soviet glaciological research projects that took place in the Caucasus, Central Asia, Khibin Mountains, Siberia, the Far East, Kamchatka, the Arctic, and Antarctica. The general subjects included mathematical modeling in glaciology, ice physics, snow and ice composition, glaciers, snow cover and avalanches, engineering geology, glacial geology and paleogeology, glacier flow, ground ice, river and lake ice, and naleds. For the Arctic, the projects included glaciation and ice cores. The projects for Antarctica were: glacier oscillation, glaciometeorological observations, glacioclimatic zoning, drilling of the ice sheet at Vostok Station, zoning of antarctic glaciers, ice core analysis at Dome B, and paleoclimatic reconstruction.

46-3694
Present state and prospects of glaciological studies in China. [Sostoianie i perspektivy gliatsiologicheskikh issledovaniĭ v Kitae].
Xie, Z.C., *Akademiia nauk SSSR. Institut geografii Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.222-227, In Russian. 16 refs.
Research projects, Glaciology.

46-3695
Tien-Shan Glaciological Research Station of the Institute of Glaciology and Geocryology of the Academy of Sciences of the Chinese Peoples' Republic. [Tianshanskaia gliatsiologicheskaia stantsiia instituta gliatsiologii i geokriologii Akademii nauk KNR].
Afzin, V.B., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.227-230, In Russian.
Glacier surveys, Glacier thickness, Glacier mass balance, Glacial hydrology, Glacial meteorology.

46-3696
Comments on "Antarctic-type ice sheets in the Northern Hemisphere (toward a global glacial theory)" by M.G. Grosval'd.
Chizhov, O.P., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.232-233, In Russian. 12 refs.
For original Russian article see 43-3299.
Ice age theory, Ice sheets, Glaciation, Paleoclimatology, Glacial geology, Glacier formation.

46-3697
Soviet-French Workshop on the Results of Cores from Antarctic Boreholes, May-June 1989. [Sovetsko-frantsuzskiĭ seminar po itogam issledovaniĭ ledianogo kerna iz antarkticheskikh skvazhin, 30 maia-9 iiunia 1989 g.].
Glazovskiĭ, A.F., *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.234, In Russian.
Meetings, International cooperation, Boreholes, Ice cores, Drill core analysis, Global change, Paleoclimatology, Antarctica—Vostok Station.
The central focus of this workshop was the analysis of ice core data from Vostok Station in terms of long-term global changes in the paleoclimate and environment. This brief report lists the participants in the workshop and presents the highlights of their findings. It concludes with future plans to drill ice cores in Adélie Coast, Dome C, and Greenland.

46-3698
Medvezhiy Glacier is advancing (end of May, 1989). [Lednik Medvezhiĭ nastupaet (konets maia 1989 g.)].
Osipova, G.B., et al, *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, May 1989, Vol.66, p.235-236, In Russian.
Tsvetkov, D.G., Morozov, V.IU., Kernosov, G.A.
Glacier oscillation, Glacier tongues, Glacier surfaces, Glacier flow.

46-3699
Late Weichselian glacial maximum on western Spitsbergen inferred from offshore sediment cores.
Svendsen, J.I., et al, *Marine geology*, Feb. 29, 1992, 104(1-4), p.1-17, Refs. p.15-17.
Glaciation, Pleistocene, Marine geology, Glacial geology, Sedimentation, Drill core analysis, Bottom sediment, Age determination, Grounded ice, Norway—Spitsbergen.

46-3700
Nuclear-powered icebreakers of Murmansk Shipping Company.
Demianchenko, V., et al, *Soviet shipping*, 1991, No.2, p.22-23.
Kovalenko, V., Shershnev, V.
Marine transportation, Icebreakers, Nuclear power, Specifications, Safety.

46-3701
Influence of clear felling on temperature and vegetation in an esker area at Lammi, southern Finland.
Tikkanen, M., et al, *Fennia*, 1991, 169(1), p.1-24, 55 refs.
Heikkilä, R.
Microclimatology, Frost, Vegetation factors, Topographic effects, Air temperature, Plant ecology, Snow cover effect, Protective vegetation, Trees (plants), Temperature variations.

46-3702
Pattern and process of present tree-limits in the Tärna region, southern Swedish Lapland.
Kullman, L., *Fennia*, 1991, 169(1), p.25-38, 62 refs.
Forest lines, Vegetation patterns, Trees (plants), Temperature effects, Altitude, Climatic factors, Growth, Alpine landscapes, Age determination, Sweden.

46-3703
Tropospheric ozone variations in the Arctic during January 1990.
Hofmann, D.J., et al, *Planetary and space science*, Feb.-Mar. 1992, 40(2-3), p.203-210, 20 refs.
Ferguson, E.E., Johnston, P.V., Matthews, W.A.
Polar atmospheres, Atmospheric composition, Ozone, Air pollution, Air temperature, Photochemical reactions, Atmospheric attenuation, Temperature effects, Temperature inversion, Periodic variations.

46-3704
Clay minerals of four soils formed in eolian and tephra materials in Iceland.
Wada, K., et al, *Geoderma*, Mar. 1992, 52(3-4), p.351-365, 23 refs.
Clay minerals, Soil formation, Eolian soils, Weathering, Soil erosion, Mineralogy, Volcanic ash, Soil profiles, Glacial deposits, Iceland.

46-3705
Solar radiative fluxes for broken cloud fields above reflecting surfaces.
Barker, H.W., et al, *Journal of the atmospheric sciences*, May 1, 1992, 49(9), p.749-761, 32 refs.
Davies, J.A.
Cloud cover, Remote sensing, Albedo, Solar radiation, Radiation balance, Reflectivity, Surface properties, Climatology, Ice cover effect, Analysis (mathematics).

46-3706
Atmospheric concentrations of submicron contact-freezing nuclei.
Deshler, T., et al, *Journal of the atmospheric sciences*, May 1, 1992, 49(9), p.773-784, 64 refs.
Vali, G.
Cloud physics, Heterogeneous nucleation, Ice crystal growth, Freezing nuclei, Aerosols, Supercooling, Cloud droplets, Temperature effects, Freezing rate.

46-3707
Potential for photoinhibition of *Pinus sylvestris* L. seedlings exposed to high light and low soil temperature.
DeLucia, E.H., et al, *Journal of experimental botany*, May 1991, 42(238), p.611-617, 44 refs.
Day, T.A., Öquist, G.
Trees (plants), Plant physiology, Photosynthesis, Light effects, Soil temperature, Temperature effects, Snow cover effect, Water transport, Plants (botany), Subsurface structures.

46-3708
Plant tissue impedance and cold acclimation: a re-analysis.
Zhang, M.I.N., et al, *Journal of experimental botany*. Feb. 1992, 43(247), p.263-266, 12 refs.
Stout, D.G., Willison, J.H.M.
Plant tissues, Plant physiology, Acclimatization, Electrical properties, Electrical measurement, Models, Simulation, Cold tolerance, Temperature effects.

46-3709
Temporal variations in water quality and fluvial erosion in a small drainage basin in southern Finland.
Tikkanen, M., *Fennia*, 1990, 168(1), p.1-29, 46 refs.
River basins, Runoff, Sediment transport, Snowmelt, Water erosion, Flooding, Surface waters, Diurnal variations, Snow water equivalent.

46-3710
Polar cloud and surface classification using AVHRR imagery: an intercomparison of methods.
Welch, R.M., et al, *Journal of applied meteorology*, May 1992, 31(5), p.405-420, 35 refs.
Cloud cover, Arctic landscapes, Radiometry, Spaceborne photography, Classifications, Image processing, Ice cover effect, Data processing, Accuracy, Climatic changes.

46-3711
Narrowband to broadband conversion with spatially autocorrelated reflectance measurements.
Li, Z.Q., et al, *Journal of applied meteorology*, May 1992, 31(5), p.421-432, 27 refs.
Leighton, H.G.
Geophysical surveys, Spectra, Radiometry, Spaceborne photography, Albedo, Cloud cover, Ice cover effect, Data processing, Correlation, Accuracy.

46-3712
Heat transfer on accreting ice surfaces.
Yamaguchi, K., et al, *Journal of aircraft*, Jan.-Feb. 1992, 29(1), p.108-113, 11 refs.
Hansman, R.J., Jr.
Aircraft icing, Surface roughness, Ice accretion, Glaze, Heat transfer, Turbulent boundary layer, Ice models, Air flow, Ice forecasting, Ice air interface.

46-3713
Sverdrup revisited: critical depths, maximum chlorophyll levels, and the control of southern ocean productivity by the irradiance-mixing regime.
Nelson, D.M., et al, *Limnology and oceanography*, Dec. 1991, 36(8), p.1650-1661, 51 refs.
Smith, W.O., Jr.
Sea water, Sea ice, Plankton, Chemistry, Antarctica—Weddell Sea, Scotia Sea.
A reformulation of Sverdrup's critical-depth calculation, using recent optical and physiological information, is developed and applied to data from the southern ocean. Comparisons between calculated critical depths (Zc) and mixed-layer depths (Zm) indicate that both the marginal ice zone and the open waters of the Antarctic Circumpolar Current provide favorable irradiance-mixing regimes for the initiation and early development of phytoplankton blooms in summer, i.e. Zc>Zm when phytoplankton biomass is low and the water clear; that when ice-edge blooms develop, Zc shoals to depths about equal to Zm, implying that phytoplankton standing stocks in ice-edge blooms may be self-limiting as a result of reduced penetration of irradiance; and that the highest chlorophyll levels that can be sustained in summer in open waters not stabilized by meltwater are 1.0 microgram/liter in the Weddell and Scotia Seas, and may be less in areas that experience stronger winds. (Auth.)

46-3714
On estimating spatial and temporal variations in the properties of ice in the polar oceans.
Maykut, G.A., et al, *Journal of marine systems*, Mar. 1992, 3(1-2), p.41-72, Refs. p.69-72.
Grenfell, T.C., Weeks, W.F.
Sea ice distribution, Remote sensing, Physical properties, Ice models, Ice forecasting, Ice cover thickness, Air ice water interaction, Thermodynamics, Temperature effects.

46-3715
Predictive bio-optical relationships for polar oceans and marginal ice zones.
Mitchell, B.G., *Journal of marine systems*, Mar. 1992, 3(1-2), p.91-105, Refs. p.104-105.
Sea ice, Biomass, Plankton, Optical properties, Sea water, Attenuation, Radiance, Remote sensing, Ice edge, Marine biology, Antarctica—Drake Passage.
An analysis of more than 500 stations from polar seas was undertaken to evaluate predictive models linking *in situ* phytoplankton pigment concentrations to measurable optical parameters. The data set consists of profiles of spectral downwelling irradiance, upwelling radiance, chlorophyll and phaeopigments from 3 cruises to the Antarctic Peninsula, one cruise to the Barents Sea and one cruise to Fram Strait in the Greenland Sea. The pigment-specific diffuse attenuation coefficient for polar regions is significantly smaller, particularly in the blue region of the spectrum, than previous statistical models for temperate oceans predict. Phytoplankton remote sensing pigment retrieval algorithms show significant differentiation from temperate ocean models. The presently recommended water-leaving radiance algorithm for Coastal Zone Color Scanner data processing underestimates surface pigment concentrations by more than a factor of two for the polar observations reported here. The observations are interpreted in the context of variations in pigment-specific particulate absorption which have been described elsewhere. Specifically, the magnitude of pigment-specific absorption coefficient in the blue is hypothesized to be smaller for polar regions due to significant pigment packaging effects, and a relatively small amount of detrital absorption compared to phytoplankton absorption. Implications for remote sensing of phytoplankton pigments and pigment-based models of light propagation in the ocean are discussed. (Auth. mod.)

46-3716
Near-surface circulation over the Yermak Plateau in northern Fram Strait.
Manley, T.O., et al, *Journal of marine systems*, Mar. 1992, 3(1-2), p.107-125, 21 refs.
Bourke, R.H., Hunkins, K.L.
Ocean currents, Hydrography, Water temperature, Ice cover effect, Salinity, Temperature effects, Stratification, Fram Strait.

46-3717
On the mesoscale structure of the frontal zones in the Nordic seas.
Rodionov, V.B., *Journal of marine systems*, Mar. 1992, 3(1-2), p.127-139, 22 refs.
Ocean currents, Hydrography, Water temperature, Sea water, Salinity, Stratification, Stability, Oceanography, Remote sensing, Greenland Sea.

46-3718
Time-dependent depth-integrated barotropic physical model of the Bering/Chukchi Seas for use in ecosystem analysis.
Shuert, P.G., et al, *Journal of marine systems*, Mar. 1992, 3(1-2), p.141-161, 35 refs.
Walsh, J.J.
Ocean currents, Air water interactions, Atmospheric pressure, Ecosystems, Biomass, Velocity measurement, Mathematical models, Wind factors, Bering Sea.

46-3719
Distribution of the two types of ice diatom communities in the Antarctic.
Meguro, H., et al, *Journal of marine systems*, Mar. 1992, 3(1-2), p.163-168, 26 refs.
Fukushima, H., Matsuda, T.
Marine biology, Algae, Distribution, Sea ice, Snow cover effect, Biomass, Ice bottom surface, Ice structure, Antarctica—Lützow-Holm Bay.
Geographical distributions for two types of ice algal assemblages, "surface type" and "bottom type" are described for the antarctic sector (35-45E) around Lützow-Holm Bay. The surface type was found in a wide belt in the outer pack ice while the bottom type was found in the narrow band of fast ice near the ice shelf or in the bay. The surface type was characterized by a thick snow cover on thin sea ice, and the bottom type typically had thin snow cover on thick ice. The circumpolar continuity of meteorological conditions around the continent, and similar floral compositions between these samples and samples collected near Palmer Peninsula by other investigators, suggests that the similar distributional pattern may be common in other regions of Antarctica. (Auth. mod.)

46-3720
Weddell-Scotia marginal ice zone: physical oceanographic conditions, geographical and seasonal variability.
Muench, R.D., et al, *Journal of marine systems*, Mar. 1992, 3(1-2), p.169-182, 22 refs.
Sea ice distribution, Ocean currents, Advection, Ice water interface, Water temperature, Ice cover effect, Ice edge, Oceanography, Seasonal variations, Antarctica—Weddell Sea.
Physical oceanographic conditions were measured in the Weddell and Scotia Sea marginal ice zones (MIZ's) during 1983, 1986 and 1988. The field work encompassed spring, autumn and mid-winter periods and included retreating, advancing and steady-state ice edges. Observed upper ocean structures, which typify MIZ's and reflect input of low salinity water from melting ice, included low salinity layers, lenses and fronts. An upper mixed layer was always present and was generally more fully developed in autumn and winter than at other times of year. Conditions in the deeper waters reflected regional oceanographic processes, and significant differences were present between the Weddell and Scotia Seas. The colder, denser Weddell water appeared to have mixed isopycnally with deeper water in the Scotia Sea, present there at depths exceeding 500 m. The Scotia Sea was dominated by strong gradients and energetic mesoscale features, with currents exceeding 50 cm/s. The northwestern Weddell Sea had, in contrast, current speeds well below about 5 cm/s and small to negligible lateral water property gradients. These observations suggest that the Weddell western boundary current was weaker than has been estimated in the past. In addition, scant evidence was found of deep winter convection in the Scotia Sea, a process which has been hypothesized in the past to contribute to deep water formation. No evidence was found during winter 1988 in the Scotia Sea of the modified water known as Weddell-Scotia Confluence water. (Auth. mod.)

46-3721
Crystal polarity: a window on ice nucleation.
McBride, J.M., *Science*, May 8, 1992, 256(5058), p.814, 4 refs.
Polarization (charge separation), Ice crystal nuclei, Nucleation.

46-3722
Role of crystal polarity in *alpha*-amino acid crystals for induced nucleation of ice.
Gavish, M., et al, *Science*, May 8, 1992, 256(5058), p.815-818, Refs. passim.
Ice crystals, Nucleation, Ice composition, Polarization (charge separation).

46-3723
Model for vertical frazil distribution.
Liou, C.P., et al, *Water resources research*, May 1992, 28(5), MP 3080, p.1329-1337, 30 refs.
Ferrick, M.G.
Frazil ice, Ice formation, Turbulent flow, Water flow, Buoyancy, Ice water interface, Ice models, Ice structure, Analysis (mathematics), Supercooling.
In this paper, a model is presented for the evolution of frazil over depth and with time in a turbulent flow. The net upward migration due to buoyancy of the frazil is opposed by intermittent mixing induced by large energy-containing eddies. A surface renewal model is used to describe the effects of large eddy mixing. Parameters that represent an entire water body are obtained by averaging those of discrete water columns, using a probability density function. These parameters include the concentration profile, the surface age, and the surface layer thickness. A dimensionless surface renewal frequency characterizes the frazil distribution at equilibrium. The rate of heat loss from the water surface, the surface renewal frequency, and the critical surface layer thickness determine whether the frazil will evolve toward a well-mixed equilibrium state or a layered state. The model provides a physical basis for understanding the transition between these states, consistent with existing empirical criteria and field data.

46-3724
Streamflow and sediment transport responses to snow fencing a rangeland watershed.
Sturges, D.L., *Water resources research*, May 1992, 28(5), p.1347-1356, 38 refs.
Snow fences, Watersheds, Stream flow, Sediment transport, Snowmelt, Runoff, Water storage, Snow retention, Performance.

46-3725
Fractographic examinations of fracture in polycrystalline S2 ice.
Wei, Y.C., et al, *Journal of materials science*, Nov. 1, 1992, 26(21), p.5733-5740, 26 refs.
Dempsey, J.P.
Ice crystal structure, Ice mechanics, Cracking (fracturing), Ice strength, Orientation, Surface structure, Thin sections, Ice cracks, Brittleness.

46-3726
Soil drying and rewetting, or freezing and thawing, affects soil solution composition.
Walworth, J.L., *Soil Science Society of America. Journal*, Mar.-Apr. 1992, 56(2), p.433-437, 25 refs.
Soil tests, Accuracy, Soil water, Storage, Freeze thaw cycles, Chemical composition, Temperature effects, Sampling.

46-3727
Planktonic bioluminescence in the pack ice and the marginal ice zone of the Beaufort Sea.
Lapota, D., et al, *Marine biology*, Apr. 1992, 112(4), p.665-675, 38 refs.
Rosenberger, D.E., Lieberman, S.H.
Sea ice, Marine biology, Plankton, Luminescence, Ice cover effect, Biomass, Ice edge, Pack ice, Oceanographic surveys, Beaufort Sea.

46-3728
Dielectric constant of ice at 26.5-40 GHz.
Koh, G., *Journal of applied physics*, May 15, 1992, 71(10), MP 3081, p.5119-5122, 7 refs.
Ice physics, Radiation absorption, Ice electrical properties, Dielectric properties, Microwaves, Wave propagation, Attenuation, Remote sensing, Electrical measurement.
The complex dielectric constant, epsilon = epsilon' + i epsilon", of ice at 26.5-40 GHz was determined using free-space measurement technique. A network analyzer-based system was used to measure the phase velocity and attenuation of a synthesized pulse propagating in bubble-free ice which was grown from distilled de-ionized water. Based on the phase velocity measurement, epsilon' was determined to be 3.155 and virtually independent of frequency. The loss factor in ice was observed to be frequency dependent so that epsilon" increased from approximately 0.002 at the lower frequencies to 0.004 at the higher frequencies. No temperature dependence of epsilon' and epsilon" was observed at ice temperatures of -2.5 and -15 C.

46-3729
Frequency and wavelength dependent dielectric permittivity of water.
Bertolini, D., et al, *Molecular physics*, Apr. 10, 1992, 75(5), p.1065-1088, 33 refs.
Tani, A.
Water structure, Molecular structure, Supercooling, Molecular energy levels, Dielectric properties, Spectra, Low temperature research, Simulation, Analysis (mathematics).

46-3730
Energy density effects in the formation of organic residues in frozen methane by MeV ions.
Kaiser, R.I., et al, *Nuclear instruments and methods in physics research*, Mar. 1992, B65(1-4), International Conference on Radiation Effects in Insulators, 6th, Weimar, Germany, June 24-28, 1991. Proceedings. Edited by E. Glaser et al, p.463-467, 18 refs.
Lauterwein, J., Müller, P., Roessler, K.
Hydrocarbons, Extraterrestrial ice, Simulation, Gamma irradiation, Ionization, Chemical composition, Spectra, Radiation absorption.

46-3731
Newest antarctic research vessel passes mid-point in construction. *Sea technology*, June 1991, 32(6), p.49-51.
Ships, Design, Icebreakers, Specifications.
This paper describes the performance capabilities of the *Nathaniel B. Palmer*, a research vessel currently under construction, planned for delivery to the National Science Foundation in Jan., 1992. The ship, with icebreaking capabilities, is destined for deployment in Antarctica to facilitate the Foundation's Antarctic Research Program.

46-3732
Recent Great Lakes ice trends.
Hanson, H.P., et al, *American Meteorological Society. Bulletin*, May 1992, 73(5), p.577-584, 27 refs.
Hanson, C.S., Yoo, B.H.
Lake ice, Ice surveys, Ice conditions, Seasonal variations, Climatic changes, Air temperature, Statistical analysis, Global warming, Great Lakes.

46-3733
Nutrient relations of mountain birch growth at and below the elevational tree-line in Swedish Lapland.
Sveinbjörnsson, B., et al, *Functional ecology*, 1992, 26(2), p.213-220, 44 refs.
Nordell, O., Kauhanen, H.
Plant ecology, Trees (plants), Forest lines, Growth, Temperature effects, Nutrient cycle, Soil chemistry, Global warming, Altitude, Sweden.

46-3734
Microfungal communities of a mixed mire in northern Sweden.
Nilsson, M., et al, *Canadian journal of botany*, Feb. 1992, 70(2), p.272-276, With French summary. 33 refs.
Baath, E., Söderström, B.
Swamps, Wetlands, Fungi, Plant ecology, Peat, Water table, Distribution, Sampling, Microbiology.

46-3735
***Phaeogalera* and *Galerina* in arctic-subarctic Alaska (U.S.A.) and the Yukon Territory (Canada).**
Horak, E., et al, *Canadian journal of botany*, Feb. 1992, 70(2), p.414-433, With French summary. Refs. p.431-433.
Miller, O.K., Jr.
Tundra, Soil surveys, Fungi, Classifications, Plant ecology, Biogeography, Meadow soils, Sampling.

46-3736
Icebreaker systems show innovations in engineering. *HSB international*, June 1991, 40(4), p.34-35.
Icebreakers, Performance, Instruments, Computer applications.

46-3737
Masa-Yards to build icebreaker for USSR. *HSB international*, Jan. 1991, 39(11), p.43.
Icebreakers, Construction, Specifications.

46-3738
Theory of two-dimensional nonlinear waves in liquid covered by ice.
Marchenko, A.V., et al, *Fluid dynamics*, Jan. 1992, 26(4), p.580-587, Translated from Akademiia nauk SSSR, Mekhanika zhidkosti i gaza, July-Aug., 1991. 15 refs.
Shrira, V.I.
Ice sheets, Fluid dynamics, Ice water interface, Wave propagation, Damping, Stresses, Mathematical models, Theory.

46-3739
Frequency of ice-wedge cracking (1967-1987) at Garry Island, western Arctic coast, Canada.
Mackay, J.R., *Canadian journal of earth sciences*, Feb. 1992, 29(2), p.236-248, With French summary. 35 refs.
Ice wedges, Cracking (fracturing), Patterned ground, Continuous permafrost, Snow cover effect, Classifications, Periodic variations, Paleoclimatology, Polygonal topography.

46-3740
Thermal regime of intertidal permafrost, George River estuary, Ungava Bay, Quebec.
Allard, M., et al, *Canadian journal of earth sciences*, Feb. 1992, 29(2), p.249-259, With French summary. 22 refs.
Fortier, R., Seguin, M.K.
Permafrost beneath rivers, Estuaries, Thermal regime, Littoral zone, Discontinuous permafrost, Freezing points, Geomorphology, Landscape development, Temperature effects.

46-3741
Delta slope processes and turbidity currents in prodeltaic submarine channels, Queen Inlet, Glacier Bay, Alaska.
Phillips, A.C., et al, *Canadian journal of earth sciences*, Jan. 1992, 29(1), p.93-101, With French summary. 35 refs.
Smith, N.D.
Deltas, Sediment transport, River flow, Turbidity, Glacier melting, Meltwater, Subsurface investigations, Tidal currents, Bottom sediment, Slope processes.

46-3742
Winter transport of Chernobyl radionuclides from a *montane catchment* to an ice-covered lake.
Brittain, J.E., et al, *Analyst*, Mar. 1992, 117(3), Colloquium Spectroscopicum Internationale (CSI) Pre-Symposium on Measurements of Radionuclides after the Chernobyl Accident, Bergen, Norway, June 6-8, 1991, p.515-519, 12 refs.
Björnstad, H.E., Salbu, B., Oughton, D.H.
Fallout, Lake ice, Water transport, Runoff, Ice cover effect, Isotope analysis, Limnology, Sampling, Seasonal variations.

46-3743
Adsorption of stratospherically important molecules on thin D2O ice films using reflection absorption infrared spectroscopy.
Horn, A.B., et al, *Chemical Society, London. Faraday Transactions*, Apr. 7, 1992, 88(7), p.1077-1078, 18 refs.
Chesters, M.A., McCoustra, M.R.S., Sodeau, J.R.
Deuterium oxide ice, Scavenging, Adsorption, Ice vapor interface, Cloud physics, Hydrogen bonds, *Chemical properties*, Ice spectroscopy, Ozone, Probes.

46-3744
Water adsorption on the NaCl surface.
Fölsch, S., et al, *Surface science*, May 1991, 247(2-3), International Seminar on Surface Physics, 14th, Przesieka, Poland, May 21-26, 1990. Proceedings. Edited by M. Steślicka et al, p.269-273, 24 refs.
Henzler, M.
High pressure ice, Adsorption, Ionization, Surface properties, Substrates, Ice spectroscopy, Defects, Low temperature research, Spectra.

46-3745
Mass balance of West Gulkana Glacier.
Chambers, F.B., et al, *Geographical review*, Jan. 1991, 81(1), p.70-86, 34 refs.
Marcus, M.G., Thompson, L.S.
Glacier mass balance, Glacier surveys, Glacier oscillation, Climatic changes, Mountain glaciers, Global warming, United States - Alaska - West Gul'ana Glacier.

46-3746
Wind speed events and wind direction at Pegasus site during 1989.
Stearns, C.R., et al, *Antarctic journal of the United States*, 1990, 25(5), p.258-262, 3 refs.
Weidner, G.A.
Wind velocity, Wind direction, Ice runways, Site surveys, Weather stations, Polar regions, Antarctica - Ross Ice Shelf.
On Jan. 22, 1989, an automatic weather station unit (Pegasus site) was installed on the Ross Ice Shelf between the ice shelf edge and White and Black islands at the blue ice region being considered for an aircraft runway. The purpose of the weather station unit was to monitor the meteorology of the blue ice region to find out if the site is satisfactory for aircraft operations. Tabulated data are presented showing the mean temperature, mean wind speed, maximum temperature, and maximum wind speed for Pegasus and nearby automatic weather station units. The average wind speed is 0.9 m/s less at Pegasus site than at Ferrell site. The big difference between Ferrell and Pegasus sites is in the maximum wind speed for each month. The average maximum wind speed for the period Feb. through Oct. 1989 is 7.3 m/s higher at Pegasus site than at Ferrell site.

46-3747
Engineering geology in the USSR; Urals, Taymyr, and the Kazakh folded region. [Inzhenernaia geologiia SSSR; Ural, Taimyr i Kazakhskaia skladchataia strana].
Pecherkin, I.A., ed, Moscow, Nedra, 1990, 407p. In Russian. 81 refs.
Dubelkovskiĭ, S.G., ed, Bochkarev, V.P., ed.
Engineering geology, Hydrogeology, Ground water, Geocryology, Ground ice, Cold weather operation.

46-3748
Geochemistry of the snow cover in Yakutia. [Geokhimiia snezhnogo pokrova lAkutii].
Makarov, V.N., et al, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, 148p., In Russian. Refs. p.144-148.
Fedoseev, N.F., Fedoseeva, V.I.
Geochemistry, Snow cover, Snow composition, Microelement content, Snow impurities.

46-3749
Problems in the mechanics of perennially frozen rocks. [Voprosy mekhaniki mnogoletnemerzlykh gornykh porod].
Izakson, V.IU., Yakutsk, lAkutskiĭ nauchnyĭ tsentr, 1990, 169p., In Russian. 102 refs.
Frozen rocks, Frozen rock strength, Rock mechanics, Phase transformations, Plastic deformation, Rheology, Thermal properties.

46-3750
Snow cover and seasonal freezing of soils in northern Tien Shan. [Snezhnyĭ pokrov i sezonnoe promerzanie gruntov Severnogo Tian'-Shania].
Severskiĭ, I.V., et al, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, 181p., In Russian. 120 refs.
Severskiĭ, E.V.
Snow cover distribution, Snow cover effect, Snow depth, Cryogenic soils, Seasonal freeze thaw, Soil freezing.

46-3751
Computer solution of a geofiltration system when establishing infiltration water intakes under conditions of natural and controlled seasonally freezing surface runoff. [Reshenie na EVM zadach geofil'tratsii pri obosnovanii infil'tratsionnykh vodozaborov v usloviiakh estestvennogo i reguliruemogo *sezonno-promerzaemogo* poverkhnostnogo stoka].
Zil'berg, V.S., et al, Matematicheskoe modelirovanie gidrogeologicheskikh protsessov; sbornik nauchnykh trudov [Mathematical modelling of hydrogeological processes; collected scientific papers]. Edited by O.F. Vasil'ev, Novosibirsk, Institut gidrodinamiki SO AN SSSR, 1984, p.67-77, In Russian.
Velikina, G.M., Kolesov, A.A.
Water intakes, Mathematical models, Seepage, Computer programs, Seasonal freeze thaw, Runoff.

46-3752
Evolution of the soil cover in the Kolyma-Indigirka Lowland in the Late Pleistocene and Holocene. [Evoliutsiia pochvennogo pokrova Kolymo-Indigirskoĭ nizmennosti v pozdnem pleĭstotsene i golotsene].
Gubin, S.V., Prostranstvenno-vremennaia organizatsiia i funktsionirovanie pochv; sbornik nauchnykh trudov [Space-time organization and functioning of soils; collected scientific papers]. Edited by I.V. Ivanov, Pushchino, Nauchnyĭ tsentr biologicheskikh issledovaniĭ AN SSSR, 1990, p.124-130, In Russian. 7 refs.
Pleistocene, Cryogenic soils, Tundra, Soil formation.

46-3753
Cryogenic physical-chemical soil processes and the problem of soil conservation in the Arctic. [Kriogennye fiziko-khimicheskie pochvennye protsessy i problema okhrany pochv Arktiki].
Ostroumov, V.E., et al, Prostranstvenno-vremennaia organizatsiia i funktsionirovanie pochv; sbornik nauchnykh trudov [*Space-time organization and functioning* of soils; collected scientific papers]. Edited by I.V. Ivanov, Pushchino, Nauchnyĭ tsentr biologicheskikh issledovaniĭ AN SSSR, 1990, p.168-177, In Russian. 12 refs.
Makeev, O.V.
Soil conservation, Cryogenic soils, Soil physics, Geocryology, Soil composition, Freeze thaw cycles.

46-3754
Water regime of cryogenic soils. ¿Vodnyĭ rezhim merzlotnykh pochv¿.
Khudiakov, O.I., Prostranstvenno-vremennaia organizatsiia i funktsionirovanie pochv; sbornik nauchnykh trudov (Space-time organization and functioning of soils; collected scientific papers). Edited by I.V. Ivanov, Pushchino, Nauchnyĭ tsentr biologicheskikh issledovaniĭ AN SSSR, 1990, p.210-221, In Russian. 2 refs.
Cryogenic soils, Water balance, Taiga, Soil water, Freeze thaw cycles, Water content, Hydrogeology.

46-3755
Geology of Antarctica.
Tingey, R.J., ed, Oxford monographs on geology and geophysics, No.17, Oxford, Clarendon Press, 1991, 680p., Refs. passim. For individual papers see 46-3756 through 46-3769 or E-46335 through E-46342, E-46345 through E-46353, F-46344 and L-46343.
Geological surveys, Geochronology, Stratigraphy, Tectonics, Geochemistry, Ice sheets, Lithology, Paleoclimatology, Continental drift, Geophysical surveys, Exploration, Marine deposits, Subglacial observations, Fossils, Antarctica.
The 19 chapters of this volume are arranged into 5 parts. The first 9 chapters describe Antarctica's geological and geophysical framework; Ch. 10 and 11 focus on the geological record of Antarctica's Cenozoic and continuing glaciation. Various aspects of antarctic paleontology are reviewed in Ch. 12-16, and Ch. 17 and 18 address the question of Antarctica's resource potential. Recovery of meteorites from the antarctic ice cap is discussed in Ch. 19. A tectonic map of the Scotia Arc region, located in the back pocket of this volume, is included.

46-3756
Regional geology of Archaean and Proterozoic rocks in Antarctica.
Tingey, R.J., Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.1-73, Refs. p.58-73.
Geological surveys, Geochronology, Stratigraphy, Bedrock, Lithology, Geological maps, Antarctica.
A review, compiled from information published by geologists from most of the nations that have, or have had, antarctic geological research programs, is presented. The following regions are described, from west to east: West Antarctica; the Shackleton Range and Coats Land; western, central and eastern Queen Maud Land; Enderby and Kemp Lands; Mac. Robertson Land; Princess Elizabeth Land; Vestfold Hills; the Shackleton Ice Shelf - Bunger Hills region; Wilkes Land; Adélie Coast and King George V Land; and the Transantarctic Mountains. A discussion of the Precambrian geology of Antarctica concludes this chapter.

46-3757
Late Proterozoic-Middle Palaeozoic rocks of Antarctica.
Laird, M.G., Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.74-119, Refs. p.110-119.
Geological surveys, Stratigraphy, Geochronology, Lithology, Geological maps, Antarctica.
Most of the known uppermost Proterozoic and Lower Paleozoic rocks of Antarctica outcrop in, or adjacent to, the Transantarctic Mountains. They are exposed in major Late Proterozoic and Early Paleozoic fold belts which border the Precambrian metamorphic shield of East Antarctica. The only known fossiliferous Early Paleozoic rocks younger than Late Cambrian are olistoliths from one locality in northern Victoria Land. However, unfossiliferous formations overlying dated Cambrian sequences in the Ellsworth and Pensacola Mountains and in the Nimrod Glacier region are of Ordovician-Silurian age, and a latest Cambrian or Ordovician age is also likely for the Leap Year Group of northern Victoria Land.

46-3758
Devonian to Jurassic Beacon Supergroup of the Transantarctic Mountains and correlatives in other parts of Antarctica.
Barrett, P.J., Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.120-152, Refs. p.147-152.
Geological surveys, Stratigraphy, Geochronology, Glaciation, Paleoclimatology, Antarctica—Transantarctic Mountains.
This review outlines the history of Beacon investigations, current lithological and time correlations within the Beacon, and the paleogeographic history of Antarctica during Beacon times from 400 to 180 m.y.a. The chapter ends with a discussion on the geography of the antarctic region during Beacon times; its tectonic setting as suggested by petrographic data from the Beacon strata; and the value of the Beacon Supergroup as a record of climatic history over a period of 200 million years, during which the antarctic continent lay almost entirely in its present polar position.

46-3759
Mesozoic tholeiitic igneous rocks in Antarctica: the Ferrar (Super) Group and related rocks.
Tingey, R.J., Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.153-174, Refs. p.170-174.
Geological surveys, Geochronology, Geochemistry, Magma, Lithology, Mineralogy, Tectonics, Antarctica.
This chapter is essentially a literature review of the Mesozoic tholeiite distribution and exploration, covering volcanic rocks, mafic intrusive rocks, and petrogenesis and tectonics. In the concluding comments, it is pointed out that the antarctic Jurassic tholeiites are subdivided on a geochemical basis into a Transantarctic Mountains sub-province showing similarities with the Tasmanian dolerites, and a Weddell Sea sub-province showing similarities with the Karoo tholeiites in South Africa. The geochemical composition of the Transantarctic tholeiites—the Ferrar Group—opens the question of crustal contamination and derivation from an anomalous mantle source in the genesis of mafic magmas. The Weddell Sea tholeiites are found to have a more normal composition and petrogenesis.

46-3760
Geology and crystallization of the Dufek intrusion.
Ford, A.B., et al, Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.175-214, Refs. p.210-214.
Himmelberg, G.R.
Geological surveys, Stratigraphy, Geochemistry, Geochronology, Magma, Lithology, Mineralogy, Antarctica—Pensacola Mountains.
The Dufek intrusion is a stratified body of chiefly gabbroic cumulates with minor interlayers of anorthosite, pyroxenite, and magnetite, and a layer of granophyre capping the cumulate sequence. Present studies show that the rocks form a differentiation sequence comparable in many aspects of mineralogy and petrology to sequences in thoroughly studied layered intrusions. In addressing the question of resources, it is pointed out that many factors hinder a realistic estimation of the Dufek resource potential, a chief one of which is its general concealment by ice; present studies have not yielded indications of platinum-group elements or any other metal concentrations of economic significance in the Dufek intrusion.

46-3761
Tectonic development of the Scotia arc region.
Barker, P.F., et al, Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.215-248, Refs. p.244-248.
Dalziel, I.W.D., Storey, B.C.
Tectonics, Continental drift, Geochronology, Geophysical surveys, Ocean bottom, Bottom topography, Scotia Sea, Antarctica—Antarctic Peninsula.
In discussing the Scotia Sea basin, it is noted that the Scotia Ridge is composed at least partly of fragments of an original continental connection between South America and the Antarctic Peninsula. All these aspects of regional tectonic evolution, starting with Gondwanaland reconstruction and the development after break-up of the intra-Gondwanaland ocean, are described in the first section of this account. In the next section, the evolution of the Pacific margin is considered, linking the onshore geology to the subduction history where known. Finally, the evidence bearing on Scotia Sea evolution is described and, starting at the present day, a series of reconstructions are given which become increasingly speculative back in time.

46-3762
Marie Byrd Land volcanic province and its relation to the Cainozoic west antarctic rift system.
LeMasurier, W.E., et al, Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.249-284, Refs. p.281-284.
Rex, D.C.
Tectonics, Geochemistry, Geochronology, Volcanoes, Lithology, Geological surveys, Antarctica—Marie Byrd Land.
The Marie Byrd Land province provides various examples of interrelationships between rift tectonics and volcanism. This chapter focuses mainly on province-wide field, petrological and chronological relationships, the nature of the rift environment, and the relationships between tectonics and volcanism. A database of K-Ar ages supports interpretations of glacial history, rates of vertical tectonic displacement, and the chronologic development of the province. The discussion relates primarily to major element chemistry; a supplementary table, diagrams, and brief comments about trace element characteristics are provided. Isotopic data provide basic constraints on the nature of the source region and allow inferences to be made by analogy with other rift systems.

46-3763
Antarctic continental shelf: results from marine geological and geophysical investigations.
Anderson, J.B., Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.285-334, Refs. p.326-334.
Marine geology, Bottom topography, Marine deposits, Glacial deposits, Exploration, Ocean bottom, Geophysical surveys, Sounding, Subglacial observations, Antarctica.
This chapter summarizes some of the important findings of research on the antarctic continental shelf and addresses the following topics: shelf physiography and the origin and development of major morphological features on the shelf; results of multichannel seismic reflection and seismic refraction surveys, with emphasis on the sedimentary basins of the shelf; hydrocarbon prospectivity of the shelf; implications of seismic data and sediments obtained in piston cores and DSDP and ODP cores to the origin and development of Antarctica's glacial maritime setting; and sedimentation on the antarctic continental shelf.

46-3764
Configuration and structure of the subglacial crust.
Bentley, C.R., Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.335-364, Refs. p.358-364.
Subglacial observations, Glacier thickness, Bottom topography, Earth crust, Geophysical surveys, Isostasy, Ice sheets, Glacier beds, Antarctica—East Antarctica, Antarctica—West Antarctica.
On the premise that the most important characteristic of the subglacial antarctic crust is the fundamental difference between East and West Antarctica, an analysis is made of the differences regarding subglacial topography, seismic refraction measurements, surface waves, body waves, and gravity. Also found of particular interest is the boundary zone between East and West Antarctica; the work carried out in this region, and other regions of interest, is reviewed. It is noted that East Antarctica is truly continental, whereas West Antarctica is some kind of borderland, the geological nature of which is being vigorously debated; that the mean thickness of its crust is about 30 km, compared with about 40 km in East Antarctica; and that the boundary between the two Antarcticas is abrupt, which is interpreted as indicating that the change in crustal thickness is also sudden.

46-3765
Cainozoic history of the antarctic ice sheet.
Denton, G.H., et al, Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.365-433, Refs. p.419-433.
Prentice, M.L., Burckle, L.H.
Ice sheets, Ice age theory, Paleoclimatology, Glacier oscillation, Geochronology, Glaciation, Antarctica.
The introductory and concluding pages of this chapter analyze the importance of antarctic ice sheet history, and its new directions, through three examples illustrating its key role: the ice age mystery, the origin of Man, and the effect of increased atmospheric CO2. The supporting discussion includes a description of the present antarctic cryosphere, the ice sheet fluctuations from Late Quaternary through Late Neogene and Tertiary, the threat to the antarctic ice sheet stability from CO2-induced warming of the lower atmosphere, and how this could affect the future behavior of the ice sheet. A working hypothesis for how antarctic ice sheet history relates to the deep-sea delta O-18 record and hominid evolution in Africa is illustrated, and five possible tests of the hypothesis are offered.

46-3766
Cainozoic glacial record in south Victoria Land: a geological evaluation of the McMurdo Sound drilling projects.
McKelvey, B.C., Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.434-454, Refs. p.449-454.
Glacial deposits, Bottom sediment, Drill core analysis, Paleoclimatology, Glaciation, Glacier oscillation, Stratigraphy, Geochronology, Antarctica—McMurdo Sound, Antarctica—Victoria Land.
To gain understanding of two major geological events, the development of the antarctic ice sheet and the uplift of the 3000 km long Transantarctic Mountains, stratigraphic data were obtained through three major drilling projects: the Dry Valley Drilling Project, the McMurdo Sound sediment and tectonic study, and the Cenozoic investigations in the western Ross Sea. The geological setting and drill site descriptions are given. Most of the six drill sites reviewed provide considerable detail of aspects of the Cenozoic glacial history, and the Cenozoic glacial regime is discussed. Included in the discussion are a stratigraphic and structural consideration about Phocene sequences at the sites; comments on provenance trends reflected in the petrographic data from all sites; and geological features of the Sirius Group and the Victoria Land Basin.

46-3767
Scientific studies relevant to the question of Antarctica's petroleum resource potential.
Behrendt, J.C., Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.588-616, Refs. p.610-616.
Exploration, Hydrocarbons, Natural resources, Geophysical surveys, Offshore drilling, Stratigraphy, Antarctica.
After some economic considerations and a brief description of environmental concerns, the geology of Antarctica—with a map of its bedrock topography and locations of sedimentary basins inferred from geophysical data—is summarized. Geophysical studies, multichannel seismic reflection surveys, and drilling studies are reviewed. Doubt is expressed at the end of the chapter that any actual economic development of petroleum resources is likely for several more decades.

46-3768
Metallic and non-metallic mineral resources of Antarctica.
Rowley, P.D., et al, Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.617-651, Refs. p.639-651.
Williams, P.L., Pride, D.E.
Exploration, Minerals, Natural resources, Geological surveys, Geochemistry, Lithology, Coal, Antarctica.
This chapter summarizes the known occurrences and deposits of metallic and non-metallic minerals in Antarctica and attempts to describe them within an overall framework of ore genesis. The term mineral 'occurrence' refers to small amounts of a mineral that in larger volumes in other parts of the world has been mined or is an indicator of a mineable deposit. In contrast, a mineral 'deposit' indicates a more substantial quantity of some mineral, although no deposits yet found in Antarctica can be commercially exploited. Mineral 'reserves' are known, identified deposits of mineral-bearing rock that can be extracted profitably with existing technology and under present economic conditions; no reserves exist in Antarctica. Mineral 'resources' consist of mineral deposits that may eventually be recovered; these include known deposits that are not economically or technologically recoverable, and inferred deposits that have not yet been discovered. A list of reports which summarize resources such as sand and gravel, manganese nodules on the ocean floor, icebergs for fresh water, and geothermal energy, is given.

46-3769
Meteorites from Antarctica.
Cassidy, W.A., Geology of Antarctica. Edited by R.J. Tingey, Oxford, Clarendon Press, 1991, p.652-666, 29 refs.
Glacier flow, Ice sheets, Ice dating, Glacier surfaces, Mineralogy, Impurities, Antarctica.
The Antarctic Ice Sheet contains areas where ice is flowing either only very slowly, or not at all because of barriers either near, or protruding above, the surface. If such sites also are undergoing active ablation, old ice is being exposed continually at the surface. Meteorites fall continually over Antarctica and generally are carried towards the sea by the moving ice. Those that are carried to the ablation zones described above, however, are uncovered at and stranded on the surface, along with other meteorites that may have fallen directly onto that surface during its existence as an area of little or no flow. The meteorites weather only very slowly because they are exposed to very little liquid water; many of the meteorites recovered from these sites therefore are very old falls and thus form a unique subset of the world's meteorite collection. Measured terrestrial ages of antarctic meteorites range between 10,000 and 950,000 yrs. Meteorite stranding surfaces are areas where ancient meteorite falls are preserved and where ancient ice is accessible for sampling. Current work is directed toward determining the ages of ice samples from these stranding surfaces. (Auth. mod.)

46-3770
Glacier fluctuations on South Georgia during the 1970s and early 1980s.
Gordon, J.E., et al, *Antarctic science*, June 1992, 4(2), p.215-226, 34 refs.
Timmis, R.J.
Glacier oscillation, Climatic factors, Glacier thickness, South Georgia.
South Georgia is a highly glacierized island with a range of glacier types including corrie, valley and tidewater ice bodies. Glaciologically, it occupies a strategic location between South America and the Antarctic Peninsula and is potentially an important locality for establishing glacier-climate relationships in the region. Baseline surveys of ice front positions and ice surface profiles have been repeated to determine recent changes in several glacier types. Corrie and small, land-based valley glaciers have continued to thin and recede during the period of study, following an advance during the 1930s. Their behavior primarily reflects the effects of seasonal temperature variations in controlling net balances, and particularly the climatic warming since 1950. The larger valley and tidewater glaciers display a lagged response and in the 1970s were at their most advanced positions since the Little Ice Age of the 17-19th centuries. However, in the last few years they too have commenced to thin and recede. (Auth.)

46-3771
Ice-damming and fluvial erosion in the Vestfold Hills, East Antarctica.
Gore, D.B., *Antarctic science*, June 1992, 4(2), p.227-234, 8 refs.
Ice dams, Hydrology, Erosion, Antarctica—Vestfold Hills.
An ice dam with a former impoundment volume of 1.1 million cu m is reported from the Vestfold Hills. The ice of the dam was derived from wind-drifted snow subsequently changed into ice by normal summer melt and freeze processes. The reformation (after 1979 and 1987) and failure of this ice dam (during 1987 and 1990) indicates the potential for the release of geomorphologically significant flows in a polar climate. The origin of a nearby fluvially eroded channel is attributed to the release of an ice-dammed impoundment. The potential of such flows for reworking glacial debris may be important when considering the sedimentology of former proglacial areas. (Auth.)

46-3772
Northern fens: methane flux and climatic change.
Roulet, N.T., et al, *Tellus*, Apr. 1992, 44B(2), p.100-105, 35 refs.
Moore, T., Bubier, J., Lafleur, P.
Wetlands, Soil air interface, Water table, Climatic changes, Carbon dioxide, Hydrocarbons, Atmospheric composition, Soil temperature, Hydrology, Subarctic landscapes.

46-3773
Three-dimensional reconstruction of single particles embedded in ice.
Penczek, P., et al, *Ultramicroscopy*, Jan. 1992, 40(1), p.33-53, 40 refs.
Radermicher, M., Frank, J.
Vitreous ice, Electron microscopy, Cryobiology, Image processing, Molecular structure, Laboratory techniques, Particles, Stereomapping.

46-3774
'CO2LT', an automated, null-balance system for studying the effects of elevated CO2 and global climate change on unmanaged ecosystems.
Oechel, W.C., et al, *Functional ecology*, 1992, 6(1), p.86-100, 36 refs.
Environmental tests, Soil air interface, Tundra, Simulation, Climatic changes, Carbon dioxide, Ecosystems, Temperature effects, Global change, Vapor transfer, Photosynthesis.

46-3775
Cooling a modern plant for a week at a time with ice.
Lueders, D., *Control engineering*, Mar. 1992, 39(5), p.14-15.
Industrial buildings, Cooling systems, Ice makers, Ice (water storage), Temperature control, Performance, Computer applications.

46-3776
Power requirements and resistance to motion of oil sand conveyors during winter operations.
Golosinki, T.S., et al, *CIM bulletin*, Apr. 1992, 85(959), p.45-51, 12 refs.
Wedzicha, J., Cholewa, W.
Mining, Machinery, Cold weather performance, Petroleum industry, Sands, Bitumens, Temperature effects.

46-3777
Heat flow and subsurface temperature as evidence for basin-scale ground-water flow, North Slope of Alaska.
Deming, D., et al, *Geological Society of America. Bulletin*, May 1992, 104(5), p.528-542, Refs. p.541-542.
Sass, J.H., Lachenbruch, A.H., De Rito, R.F.
Ground water, Geothermy, Boreholes, Water flow, Heat flux, Temperature gradients, Subsurface investigations, Petroleum industry.

46-3778
Surface form of the southern Laurentide ice sheet and its implications to ice-sheet dynamics.
Clark, P.U., *Geological Society of America. Bulletin*, May 1992, 104(5), p.595-605, Refs. p.604-605.
Ice sheets, Ice models, Pleistocene, Glacier flow, Geomorphology, Surface structure, Ice air interface, Sliding, Ice pressure.

46-3779
Studies on the nature of sulphur in peat humic acids from the Fraser River Delta, British Columbia.
Lowe, L.E., *Science of the total environment*, Mar. 15, 1992, 113(1-2), Symposium on Humic Substances, Miami Beach, FL, Sep. 10-15, 1989. Edited by P.G. Hatcher, p.133-145, 16 refs.
Peat, Organic soils, Soil analysis, Wetlands, Deltas, Soil chemistry, Chemical analysis, Soil composition, Environmental impact.

46-3780
Climatic change since Little Ice Age recorded by Dunde Ice Cap.
Yao, T.D., et al, *Science in China—Ser.B*, June 1991, 34(6), p.760-767, 14 refs.
Xie, Z.C., Wu, X.L., Thompson, L.G.
Ice sheets, Ice cores, Drill core analysis, Climatic changes, Air temperature, Temperature variations, Ice dating, Oxygen isotopes.

46-3781
Adsorption of water vapor by iron oxides. 3. Inelastic incoherent neutron scattering from water adsorbed on magnetite: evidence for an icelike structure.
Clarke, N.S., et al, *Langmuir*, Feb. 1992, 8(2), p.645-649, 12 refs.
Hall, P.G.
Water structure, Surface structure, Ice structure, Neutron scattering, Adsorption, High pressure ice, Spectra, Low temperature research, Correlation.

46-3782
Zooplankton retained in sequential sediment traps along the Beaufort Sea shelf break during winter.
Forbes, J.R., et al, *Canadian journal of fisheries and aquatic sciences*, Apr. 1992, 49(4), p.663-670, With French summary. 33 refs.
Marine biology, Plankton, Distribution, Sampling, Ice cover effect, Ecosystems, Ocean currents, Seasonal variations.

46-3783
Ambient noise measurements from 100 Hz to 80 kHz in an Alaskan fjord.
McConnell, S.O., et al, *Acoustical Society of America. Journal*, Apr. 1992, 91(4)Pt.1, p.1990-2003, 25 refs.
Schilt, M.P., Dworski, J.G.
Underwater acoustics, Sound transmission, Air water interactions, Acoustic measurement, Snowfall, Wind factors, Attenuation, Temperature effects, Seasonal variations.

46-3784
Role of sea ice in structuring antarctic ecosystems.
Eicken, H., *Polar biology*, Apr. 1992, 12(1), EPOS European Polarstern Study, Proceedings. No.1, p.3-13, Refs. p.11-13.
Ice cover effect, Sea ice, Ecosystems, Cryobiology, Marine biology, Antarctica—Weddell Sea.
Sea-ice growth may divide an oceanic ecosystem into two dissimilar compartments: the water column, with primary production controlled by the reduction of irradiative fluxes due to the snow-laden sea-ice cover and thermohaline convection, and the pore space within the ice with incorporated organisms switching from a planktonic to a "kryohaline" mode of life. In the ice, physical boundary conditions are set by the irradiance, which is controlled by the optical properties of snow and ice, and the ambient temperature which controls salinity and brine volume. Partly due to the high levels of biomass within the sea-ice system, interaction between different groups of organisms concentrates on the planar environment predefined by the ice cover. As a result of regional structuring of ecosystems, four sea-ice regimes may be recognized: seasonal pack ice, coastal zone, perennial pack ice, and marginal ice zone. These regimes are interwoven through the temporal structuring of ecosystems brought about by ice-cover seasonality and ice drift. In comparison with open-water pelagic ecosystems, sea ice appears of particular importance as it partly inverts the ecosystem structure and enhances the degree of ecological variability. (Auth. mod.)

46-3785
Nanogram determination of indium using epithermal neutrons and its application in potential source contribution function of airborne particulate matter in the arctic aerosol.
Landsberger, S., et al, *Nuclear science and engineering*, Jan. 1992, 110(1), p.79-83, 15 refs.
Hopke, P.K., Cheng, M.D.
Polar atmospheres, Sampling, Aerosols, Neutron activation analysis, Air pollution, Laboratory techniques, Accuracy, Atmospheric circulation.

46-3786
Viewing ice crystals using polarized light.
Kinsman, E.M., *Science PROBE*, Apr. 1992, 2(2), p.56-58, 2 refs.
Education, Experimentation, Ice crystal structure, Ice crystal optics, Photographic techniques, Polarization (waves).

46-3787
Making and photographing snowflake replicas.
Benko, J.J., *Science PROBE*, Jan. 1992, 2(1), p.73-76,108, 6 refs.
Education, Laboratory techniques, Snowflakes, Ice crystal replicas, Ice crystal structure, Photographic techniques, Preserving, Snow optics.

46-3788
Canadian Arctic Meteorite Project (CAMP): 1990.
Cresswell, R.G., et al, *Meteoritics*, Mar. 1992, 27(1), p.81-85, 18 refs.
Herd, R.K.
Expeditions, Sediments, Research projects, Ice sheets, Glacier surveys, Cosmic dust, Sampling, Traverses, Scattering electron microscopy.

46-3789
Observation of high ice particle concentration in convective cells and cloud glaciation evolution.
Gayet, J.F., et al, *Royal Meteorological Society. Quarterly journal*, Jan. 1992, 118(504)Pt.B, p.177-190, 28 refs.
Soulage, R.G.
Cloud physics, Ice formation, Particle size distribution, Aerial surveys, Ice air interface, Ice crystal nuclei, Precipitation (meteorology), Snow pellets

46-3790
Study on snow profiles and surface characteristics along 6000 km trans-antarctic route (I).
Qin, D.H., et al, *Science in China Ser.B*, Mar. 1992, 35(3), p.366-374, 14 refs.
Ren, J.W.
Glacier surveys, Snow stratigraphy, Profiles, Snow crystal structure, Glacier surfaces, Topographic effects, Traverses.
Along a 5,986 km route on the antarctic ice sheet from west to east, 106 snow pits with a depth ranging from 1.0-2.0 m were dug during the 1990 International Trans-Antarctic Expedition. The basic physical characteristics of the surface layer of the ice sheet on a large scale were obtained through analysis of snow profiles at these snow pits, which shows that in West Antarctica the meltwater infiltration-congelation is obvious and the annual precipitation is larger than that in East Antarctica. This implies that the climate in West Antarctica is warmer, more humid and more directly influenced by the southern ocean than that in East Antarctica. Radiation ice-glazes frequently found in snow profiles indicate that even in East Antarctica under very low temperatures, surface melting occurs in summer due to the long-time solar radiation. Depth hoar is very much developed in the snow pits of East Antarctica. (Auth. mod.)

46-3791
Assessment of aircraft icing potential using satellite data.
Curry, J.A., et al, *Journal of applied meteorology*, June 1992, 31(6), p.605-621, 38 refs.
Liu, G.S.
Aircraft icing, Climatic factors, Ice forecasting, Remote sensing, Cloud physics, Radiance, Radiometry, Temperature effects, Meteorological data.

46-3792
Design ground snow loads for Ohio.
Schmidlin, T.W., et al, *Journal of applied meteorology*, June 1992, 31(6), p.622-627, 33 refs.
Edgell, D.J., Delaney, M.A.
Building codes, Snow loads, Design criteria, Forecasting, Statistical analysis, Snow water equivalent, Periodic variations, Records (extremes).

46-3793
Pressure melting of ice under a body with flat base.
Bejan, A., et al, *Journal of heat transfer*, May 1992, 114(2), p.529-531, 15 refs.
Tyvand, P.A.
Ice melting, Ice solid interface, Melting points, Pressure, Phase transformations, Thermodynamic properties, Analysis (mathematics), Temperature effects.

46-3794
Pressure melting of ice due to an embedded cylinder.
Tyvand, P.A., et al, *Journal of heat transfer*, May 1992, 114(2), p.532-535, 6 refs.
Bejan, A.
Ice melting, Ice solid interface, Water films, Pressure, Regelation, Cables (ropes), Phase transformations, Analysis (mathematics).

46-3795
Forestry in Iceland.
Lines, R., *Scottish forestry*, Apr. 1990, 44(2), p.85-93, 8 refs.
Forestry, Cold weather operation, Trees (plants), Cold tolerance.

46-3796
Dual-aircraft investigation of the inner core of Hurricane Norbert part 2: mesoscale distribution of ice particles.
Houze, R.A., Jr., et al, *Journal of the atmospheric sciences*, June 1, 1992, 49(11), p.943-962, 11 refs.
Marks, F.D., Jr., Black, R.A.
Atmospheric disturbances, Aerial surveys, Cloud physics, Snow pellets, Distribution, Advection, Precipitation (meteorology), Radar echoes, Meteorological factors, Reflectivity.

46-3797
Long-term behavior of silica fume concrete.
Lessard, M., et al, *Concrete international*, Apr. 1992, 14(4), p.25-30, 10 refs.
Sarkar, S.L., Ksinsik, D.W., Aïtcin, P.C.
Sidewalks, Concrete aggregates, Concrete durability, Cold weather performance, Cold weather tests, Microstructure, Compressive properties.

46-3798
Analysis of ice-induced vibrations on a flexible structure.
Shih, L.Y., *Applied mathematical modelling*, Nov.-Dec. 1991, 15(11-12), p.632-638, 5 refs.
Offshore structures, Ice solid interface, Dynamic loads, Stability, Vibration, Damping, Floating ice, Mathematical models, Ice breaking, Design criteria.

46-3799
H-1 and H-2 nuclear magnetic resonance study of amorphous ices at 77 K.
Ripmeester, J.A., et al, *Journal of chemical physics*, June 1, 1992, 96(11), p.8503-8506, 32 refs.
Ratcliffe, C.I., Klug, D.D.
Ice physics, Amorphous ice, Nuclear magnetic resonance, Molecular structure, Ice density, Classifications, High pressure ice, Low temperature research, Spectra.

46-3800
Correlation study of selected exploration wells from the North Slope and Beaufort Sea, Alaska.
Scherr, J., et al, *U.S. Department of the Interior, Minerals Management Service. Alaska Outer Continental Shelf Region. OCS report*, 1991, MMS 91-0076, 29p. + 19 separate foldout charts numbered as plates, 35 refs.
Banet, S.M., Bascle, B.J.
Exploration, Well logging, Offshore drilling, Stratigraphy, Seismic surveys, Oil wells, United States - Alaska - North Slope.

46-3801
Chemical deicers and the environment.
D'Itri, F.M., ed, Chelsea, MI, Lewis Publishers, 1992, 585p., Refs. passim. For individual papers see 46-3802 through 46-3824.
Road maintenance, Road icing, Chemical ice prevention, Salting, Environmental impact, Water pollution, Cost analysis.

46-3802
Environmental impact of road salting.
Jones, P.H., et al, Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.1-116, 243 refs.
Jeffrey, B.A., Watler, P.K., Hutchon, H.
Road maintenance, Salting, Chemical ice prevention, Environmental impact, Pollution, Road icing, Corrosion, Legislation.

46-3803
USEPA research program on the environmental impacts and control of highway deicing salt pollution.
Field, R., et al, Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.117-133, 9 refs.
O'Shea, M.L.
Road maintenance, Salting, Environmental impact, Chemical ice prevention, Pollution, Cost analysis, Road icing.

46-3804
Deicing chemical use on the Michigan state highway system.
Gales, J.E., et al, Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.135-184, 93 refs.
VanderMeulen, J.
Road maintenance, Chemical ice prevention, Salting, Environmental impact, Road icing.

46-3805
Michigan environmental road safety act.
Van Regenmorter, W., Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.185-192.
Road maintenance, Chemical ice prevention, Environmental protection, Salting, Legislation.

46-3806
Environmental impact and toxicological characteristics of calcium magnesium acetate.
McFarland, B.L., et al, Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.193-227, 50 refs.
O'Reilly, K.T.
Road maintenance, Chemical ice prevention, Environmental impact, Road icing, Physiological effects, Health, Pollution.

46-3807
Environmental effects of calcium magnesium acetate on natural phytoplankton and bacterial communities in northern Californian lakes.
Goldman, C.R., et al, Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.229-244, 24 refs.
Lubnow, F.S., Elser, J.J.
Road maintenance, Chemical ice prevention, Environmental impact, Salting, Water pollution, Physiological effects, Plankton, Bacteria, Road icing, Lake water.

46-3808
Effects of road deicing salt on aquatic invertebrates in four Adirondack streams.
Demers, C.L., Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.245-251, 11 refs.
Road maintenance, Salting, Environmental impact, Chemical ice prevention, Water pollution, Road icing, Physiological effects.

46-3809
Deicing salt dispersion and effects on vegetation along highways. Case study: deicing salt deposition on the Morton Arboretum.
Kelsey, P.D., et al, Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.253-281, 38 refs.
Hootman, R.G.
Road maintenance, Salting, Environmental impact, Chemical ice prevention, Road icing, Physiological effects, Plant physiology, Trees (plants).

46-3810
Groundwater pathways for chloride pollution of lakes.
Bowser, C.J., Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.283-301, 21 refs.
Road maintenance, Salting, Environmental impact, Chemical ice prevention, Road icing, Water pollution, Ground water, Lake water.

46-3811
Historical trends of chlorides in the Great Lakes.
Moll, R.A., et al, Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.303-322, 18 refs.
Rossmann, R., Barres, J.A., Horvath, F.J.
Water pollution, Lake water, Water chemistry, Salting, Environmental impact, Chemical ice prevention, Road maintenance, Great Lakes.

46-3812
Environmental impact of deicers in airport stormwater runoff.
Sills, R.D., et al, Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.323-340, 39 refs.
Blakeslee, P.A.
Runways, Chemical ice prevention, Environmental impact, Water pollution, Runoff.

46-3813
Comparison of conventional and alternative deicers: an environmental perspective.
Moran, V.M., et al, Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.341-361, 16 refs.
Abron, L.A., Weinberger, L.W.
Road maintenance, Chemical ice prevention, Environmental impact, Road icing, Salting, Pollution.

46-3814
Corrosion and alternative deicers.
McCrum, R.L., Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.363-402, 13 refs.
Road maintenance, Chemical ice prevention, Corrosion, Salting, Environmental impact, Road icing.

46-3815
New salt based highway deicers with improved anticorrosive properties.
Ireland, D.T., Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.403-420, 7 refs.
Road maintenance, Salting, Chemical ice prevention, Road icing, Corrosion, Environmental impact.

46-3816
Overview of the National Research Council study of the comparative costs of using rock salt and CMA for highway deicing.
Menzies, T.R., Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.421-429, 1 ref.
Road maintenance, Chemical ice prevention, Salting, Environmental impact, Road icing, Cost analysis.

46-3817
Benefits and costs in the use of salt to deice highways.
Hanneman, R.L., Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.431-439, 16 refs.
Road maintenance, Salting, Chemical ice prevention, Environmental impact, Road icing, Cost analysis.

46-3818
Environmental costs of road salting.
Vitaliano, D.F., Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.441-461, 30 refs.
Road maintenance, Salting, Environmental impact, Chemical ice prevention, Road icing, Cost analysis, Health, Statistical analysis.

46-3819
Research to reduce the cost of calcium magnesium acetate.
Bryan, W.L., Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.463-479, 36 refs.
Road maintenance, Chemical ice prevention, Salting, Road icing, Environmental impact, Cost analysis, Chemical properties, Manufacturing.

46-3820
Persistence of reduced snow to pavement shear strength for two aggregate materials treated with CMA and NaCl.
Adams, E.E., et al, Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.481-493, 4 refs.
Road icing, Chemical ice prevention, Road maintenance, Salting, Snow removal, Ice adhesion.

46-3821
Comparative study of chemical deicers: undercutting and disbondment.
Kirchner, H.W., Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.495-518, 5 refs.
Road icing, Road maintenance, Chemical ice prevention, Salting, Artificial melting, Ice adhesion.

46-3822
***Remediating* highway deicing salt contamination of public and private water supplies in Massachusetts.**
Pollock, S.J., Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.519-538, 2 refs.
Road maintenance, Salting, Chemical ice prevention, Road icing, Environmental impact, Environmental protection, Water pollution, Water supply, Cost analysis.

46-3823
Winter highway maintenance in Michigan.
O'Doherty, J.D., Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.539-551.
Road maintenance, Chemical ice prevention, Salting, Road icing, Cost analysis, Safety.

46-3824
CMA use on the Zilwaukee Bridge.
Miller, W.L., Chemical deicers and the environment. Edited by F.M. D'Itri, Chelsea, MI, Lewis Publishers, 1992, p.553-557.
Road maintenance, Chemical ice prevention, Bridges, Road icing.

46-3825
Physics and chemistry of ice.
Maeno, N., ed, Sapporo, Japan, Hokkaido University Press, 1992, 516p., Refs. passim. For individual papers see 46-3826 through 46-3908.
Hondoh, T., ed, International Symposium on the Physics and Chemistry of Ice, Sapporo, Sep. 1-6, 1991.
Ice crystal structure, Ice crystal growth, Ice thermal properties, Ice deformation, Ice pressure, Ice electrical properties, Ice spectroscopy, Ice composition, Molecular energy levels, Molecular structure, Phase transformations, Hydrogen bonds, High pressure ice.

46-3826
Slow dynamics of ordering processes in ice Ih and clathrate hydrates.
Suga, H., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.1-8, 33 refs.
Matsuo, T., Yamamuro, O.
Molecular energy levels, Ice crystal structure, Ice thermal properties, Hydrates, Doped ice, Deuterium oxide ice, Ice spectroscopy, Hydrogen bonds.

46-3827
Dielectric and neutron diffraction studies of the transformation of ice Ih to ice XI in KOH-doped single crystals.
Oguro, M., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.9-13, 22 refs.
Whitworth, R.W., Wilson, C.C.
High pressure ice, Ice crystal structure, Doped ice, Ice thermal properties, Ice electrical properties, Neutron diffraction, Phase transformations, Ice spectroscopy, Solid phases.

46-3828
Low temperature phases of ice Ih.
Minagawa, I., Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.14-19, 8 refs.
Molecular energy levels, Ice crystal structure, Ice thermal properties, Phase transformations, Ice spectroscopy, Low temperature research, Analysis (mathematics), Solid phases.

46-3829
Successive changes and developments of the dielectric relaxation process toward 72K phase transition in the alkali-hydroxide-doped ice single crystals.
Kawada, S., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.20-26, 9 refs.
Doped ice, Ice crystal structure, Ice electrical properties, Ice thermal properties, Dielectric properties, Proton transport, Phase transformations.

46-3830
Neutron scattering studies of ice dynamics. Part I. *Inelastic incoherent neutron scattering studies of ice Ih (D2O, H2O and HDO).*
Li, J.C., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.27-34, 21 refs.
Ross, D.K.
Molecular energy levels, Ice crystal structure, Ice thermal properties, Ice spectroscopy, Deuterium oxide ice, Neutron scattering.

46-3831
Neutron scattering studies of ice dynamics. Part II. Lattice dynamic calculation on ice Ih based on the *orientationally disordered dipole model.*
Li, J.C., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.35-42, 21 refs.
Ross, D.K.
Molecular energy levels, Ice crystal structure, Ice thermal properties, Ice spectroscopy, Neutron scattering, Deuterium oxide ice, Hydrogen bonds.

46-3832
***Neutron scattering studies of ice dynamics.* Part III. Inelastic incoherent neutron scattering studies of ice II, V, VI, VIII and IX.**
Li, J.C., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.43-49, 14 refs.
High pressure ice, Ice crystal structure, Ice thermal properties, Ice spectroscopy, Neutron scattering, Deuterium oxide ice, Molecular energy levels.

46-3833
Structure of ice Ih on approaching the melting point.
Kuhs, W.F., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.50-53, 10 refs.
Knupfer, M.
Molecular energy levels, Ice crystal structure, Ice thermal properties, Ice spectroscopy, Deuterium oxide ice, Hydrogen bonds.

46-3834
Structural studies and molecular dynamics simulations of defects in ice.
Plummer, P.L.M., Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.54-61, 10 refs.
Ice crystal structure, Ice thermal properties, Molecular energy levels, Crystal defects.

46-3835
Electron density distribution of ice Ih obtained by the maximum entropy method.
Sakata, M., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.62-68, 8 refs.
Molecular energy levels, Ice crystal structure, Ice spectroscopy, Hydrogen bonds, Ice thermal properties.

46-3836
Temperature dependence of x-ray diffuse scattering intensity in ice Ih.
Goto, A., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.69-74, 17 refs.
Satoh, K., Hondoh, T., Mae, S.
Ice crystal structure, Ice thermal properties, Ice spectroscopy, X ray diffraction.

46-3837
On the metallization of ice under ultra-high pressures.
Hama, J., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.75-82, 16 refs.
Suito, K.
High pressure ice, Ice crystal structure, Molecular energy levels, Extraterrestrial ice, Planetary environments, Phase transformations, Solid phases.

46-3838
Near-infrared studies of high pressure water and ices.
Kato, M., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.83-87, 12 refs.
Taniguchi, Y., Sawamura, S., Suzuki, K.
High pressure ice, Ice spectroscopy, Molecular energy levels, Water structure, Infrared spectroscopy, Hydrogen bonds.

46-3839
Role of long-range electrical forces on the infrared spectrum of ice Ih.
Klug, D.D., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.88-90, 13 refs.
Tse, J.S., Whalley, E.
Ice spectroscopy, Molecular energy level, Ice electrical properties, Infrared spectroscopy.

46-3840
Pressure induced amorphization of ice and clathrate hydrates.
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Amorphous ice, Hydrates, Ice thermal properties, Molecular structure, Phase transformations, Ice crystal structure, Clathrates, High pressure ice.

46-3841
Amorphous states of water—a comparison with liquid water studied as a function of temperature.
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Amorphous ice, Water structure, Ice thermal properties, Molecular structure, Deuterium oxide ice, Phase transformations, High pressure ice.

46-3842
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Amorphous ice, Molecular structure, Ice thermal properties, Computerized simulation, Phase transformations, Solid phases, Ice crystal structure, Molecular energy levels, High pressure ice.

46-3843
Reorientational anisotropy of hydrated water molecules in electrolyte solutions studied by NMR spectroscopy.
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Shimizu, A.
Ion exchange, Water chemistry, Molecular energy levels, Hydrates, Nuclear magnetic resonance, Water structure, Analysis (mathematics), Heavy water.

46-3844
Gas hydrate phase equilibria description using thermodynamic models with guest-guest interaction.
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Koluchev, N.R.
Hydrates, Water chemistry, Molecular structure, Water structure, Clathrates, Thermodynamic properties, Phase transformations, Mathematical models.

46-3845
In-situ observations of growth process of clathrate air-hydrates under hydrostatic pressure.
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Ice crystal growth, Hydrates, Ice pressure, Glacier ice, Bubbles, Clathrates, Ice microstructure, Ice composition.

46-3846
In-situ study on composition and structure of Ar-clathrate.
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Dorwarth, R., Londono, D., Finney, J.L.
Clathrates, Hydrates, Molecular structure, Hydrogen bonds, Ice crystal structure.

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Taniguchi, Y., Suzuki, K.
Hydrates, Water chemistry, Molecular structure, Clathrates, Ice crystal structure, Compressive properties.

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Ice composition, Ice crystal structure, Hydrates, Clathrates, Molecular structure, Low temperature research.

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Effect of static electric fields on protonic conductivity of ice single crystals.
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Ice crystal structure, Ice electrical properties, Crystal defects, Proton transport, Mathematical models.

46-3851
Dielectric properties of wet and dry snow, 50 Hz-100 kHz.
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Labrecque, D.R.
Wet snow, Snow electrical properties, Snow water content, Dielectric properties, Snowmelt, Electrical resistivity.
Little information is available concerning the dielectric properties of wet or dry snow in the frequency range of the Debye dispersion in ice. This spectral region is interesting because here the dielectric behavior of the ice grains changes rapidly. Samples of six different snowstorms have been gathered and stored under similar conditions. Meltwater has been analyzed for conductivity, pH, and various ionic impurities. Dielectric properties have been measured for these snows, both dry and with various water contents. Water content was changed with minimum disturbance of the sample by melting a portion of the sample in place using resistive heating at 20 kHz.

46-3852
Photoluminescence of ice Ih in a spectral region 180-300 nm.
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Ice optics, Ice spectroscopy, Molecular energy levels, Luminescence.

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Doped ice, Ice optics, Ice spectroscopy, Photochemical reactions.

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Ice electrical properties, Ice cracks, Ice deformation, Crack propagation, Analysis (mathematics).

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Ice surface, Ice spectroscopy, Molecular energy levels, Infrared spectroscopy, Hydrogen bonds, Amorphous ice.

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Second harmonic generation laser studies of ice surfaces.
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Ice surface, Ice spectroscopy, Ice optics, Lasers, Molecular structure, Ice water interface, Ice vapor interface.

46-3857
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Ice surface, Ice crystal structure, Ice spectroscopy, X ray diffraction.

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Ice crystal structure, Ice thermal properties, Ice water interface, Ice crystal optics, Ice microstructure.

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Grain boundary migration in bicrystals of ice.
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Di Prinzio, C.L., Levi, L.
Ice crystal structure, Ice thermal properties, Ice crystal growth, Surface energy.

46-3860
Measurement of dynamic friction of ice.
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Huber, N.P.
Ice friction, Ice surface, Surface roughness, Sleds, Ice metal friction, Mechanical tests.
A series of friction measurements was made between a rotating ice cylinder and bobsled runners of various roughness. The friction increased to a maximum and then dropped.

46-3861
Ice rheology and its importance in planetary geophysics.
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Extraterrestrial ice, Planetary environments, Rheology, Ice deformation, Ice creep, Ground ice, Geophysics, Ice thermal properties.

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Mars (planet), Extraterrestrial ice, Planetary environments, Carbon dioxide, Seasonal variations.

46-3863
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Ice thermal properties, Amorphous ice, Extraterrestrial ice, Thermal conductivity, Cubic ice, Cosmic dust.

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Ice thermal properties, Ice strength, Extraterrestrial ice, Impact strength, Low temperature tests.

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Ice crystal growth, Cryobiology, Organic nuclei, Antifreezes, Cold weather survival, Frost resistance.

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Ice crystal growth, Organic nuclei, Polymers.

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Molecular energy levels, Water chemistry, Solutions, Phase transformations, Liquid phases, Solid phases, Thermal analysis, Vitreous ice.

46-3868
DSC studies on ice in polysaccharide hydrogels.
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Ice thermal properties, Water chemistry, Solutions, Amorphous ice, Water structure, Phase transformations.

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Heat shock protects yeast cells from freezing injury caused by ice formation.
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Cryobiology, Vitreous ice, Molecular structure, Water chemistry, Water structure, Thermal stress, Frost resistance, Ice formation, Hygroscopic water.

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Observation of ice crystals produced in biological systems by electron microscopy.
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Cryobiology, Ice crystal structure, Ice crystal replicas, Scanning electron microscopy.

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Crystallization dynamics of water in polysaccharide hydrogels.
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Ice crystal growth, Ice thermal properties, Vitreous ice, Solutions, Water chemistry, Ice spectroscopy, Hygroscopic water.

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Ice crystal growth in aqueous solutions and suspensions.
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Ice crystal growth, Freezing front, Ice water interface, Solutions, Phase transformations, Impurities.

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Morphology of the ice crystal grown in supercooled water.
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Ice crystal growth, Dendritic ice, Ice crystal structure, Supercooling, Ice water interface, Ice crystal optics.

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Morphology of D2O crystals in melt.
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Ice crystal growth, Ice crystal structure, Deuterium oxide ice, Dendritic ice, Supercooling.

46-3875
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Asano, A., Yamashita, A.
Ice crystal growth, Ice crystal structure, Ice crystal size, Photographic techniques.

46-3876
Structure of sea gull type snow crystals.
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Kikuchi, K.
Snow crystal structure, Snow crystal growth, Photographic techniques, Cubic ice.

46-3877
Experimental study on the "halo" formation in artificial ice cloud.
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Haflett, J.
Ice crystal structure, Ice fog, Ice crystal optics, Ice crystal replicas.

46-3878
Structure of polycrystalline initial ice crystals.
Kikuchi, K., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.328-335, 8 refs.
Harada, M., Uyeda, H.
Ice crystal structure, Snow crystal structure, Ice fog, Ice crystal optics, Ice crystal replicas, Cubic ice.
From among a number of microphotographs of ice and snow crystals photographed in ice prism and ice fog phenomena observed in the arctic and antarctic regions, the polycrystalline initial ice crystals (poly-snow germs) were selected and were classified into twelve types. Almost all of them were crossed plates types and their formation rate was approximately 5%. To investigate the shapes of artificial poly-snow germs and their production rate, laboratory experiments using a cloud chamber were carried out under temperature conditions between -14 and -42 C. As a result, almost all shapes which were observed in nature were produced in the chamber and the production rate was less than 5%. This value was similar to that of observational results. As one of the mechanisms for growth of these poly-snow germs, a cubic structure model might be possible. (Auth. mod.)

46-3879
Pressure and temperature effects on the parameters of ice crystal plane growth in the surface liquid layer.
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Fukuta, N.
Ice crystal growth, Surface energy, Water films, Ice thermal properties, Two dimensional nucleation, Phase transformations, Ice water interface, Liquid solid interfaces, Analysis (mathematics).

46-3880
Crystallization of water rich amorphous mixtures.
Schmitt, B., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.344-348, 9 refs.
Grim, S.R.J.A., Greenberg, J.M., Klinger, J.
Ice crystal growth, Amorphous ice, Ice thermal properties, Ice spectroscopy.

46-3881
Faceted growth of ice crystals growing at temperatures just below the melting point.
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Gonda, T.
Ice crystal growth, Ice thermal properties, Ice crystal replicas, Ice vapor interface, Supersaturation, Ice air interface, Photographic techniques, Supercooling.

46-3882
Laboratory simulation of needle ice.
Branson, J., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.357-363, 16 refs.
Fawler, D.M., Glen, J.W.
Ice needles, Ice crystal growth, Soil freezing, Ice growth, Frozen ground chemistry, Frozen ground thermodynamics, Freeze thaw cycles, Artificial ice, Laboratory techniques.

46-3883
Mathematical model on the steady growth of an ice layer in freezing soils.
Nakano, Y., MP 3084, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.364-369, 14 refs.
Soil freezing, Frozen ground thermodynamics, Ice growth, Freezing front, Soil water migration, Mathematical models.
Recently three distinct and representative hypotheses on the properties of the frozen fringe were evaluated mathematically and experimentally for a special case where the steady growth of an ice layer occurs in freezing soils. It was found that a hypothesis based on the independence of temperature and unfrozen water pressure in the frozen fringe was consistent with empirical data. The properties of the mathematical solution to the problem of steady growth of an ice layer under this hypothesis are presented.

46-3884
Experimental study on ice segregation during soil freezing.
Takeda, K., Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.370-378, 9 refs.
Soil freezing, Frozen ground thermodynamics, Freezing front, Ice growth, Frost heave, Ground ice, Soil tests, Mathematical models.

46-3885
Ice segregation from supercooled water through porous materials.
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Kinoshita, S.
Ice growth, Freezing front, Supercooling, Porous materials, Filters.

46-3886
Dielectric response of water and ice in frozen soils.
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Araki, T., Moore, J., Fukuda, M.
Frozen ground thermodynamics, Ice electrical properties, Soil water, Unfrozen water content, Dielectric properties.

46-3887
Freezing potential of aqueous lithium chloride solutions containing organic additives: fine structures and oscillation.
Sashida, N., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.387-394, 19 refs.
Samata, T., Kaneko, K., Ozeki, S.
Freezing potential (electrical), Ice growth, Ice electrical properties, Solutions, Frozen liquids, Water chemistry.

46-3888
Express method of single crystal growth for pure and doped ice Ih.
Khusnatdinov, N.N., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.395-398, 7 refs.
Petrenko, V.F.
Ice crystal growth, Artificial ice, Doped ice, Ice water interface, Ice vapor interface.

46-3889
Isotopic composition of sea ice as a tool for understanding sea ice processes in the polar regions.
Lange, M.A., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.399-405, 10 refs.
Hubberten, H.W.
Sea ice, Ice composition, Snow ice interface, Snow composition, Isotope analysis, Oxygen isotopes, Ice salinity, Ice growth, Antarctica, Weddell Sea.
New data are reported on sea ice and its snow cover from the Weddell Sea. The samples were obtained during the Winter Weddell Gyre Study 1989 (WWGS'89) on RV *Polarstern*. The main emphasis of the present study is in unraveling the complex history and development of sea ice and snow through textural analysis and measurements of salinity and O-18. The concentration of O-18 provides information on the incorporation of meteoric ice into sea ice and on post-freezing deposition processes in snow and ice. In conjunction with other data (e.g. ice thickness distribution) obtained at the same ice floes, one can determine its developmental history, otherwise hidden. Measurement of O-18 as an important tool in sea ice dynamics study is recommended. (Auth. mod.)

46-3890
Crystal orientation fabrics affecting flow behaviors of polycrystalline ice.
Shoji, H., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.406-407, 6 refs.
Kobayashi, M., Langway, C.C., Jr.
Ice crystal structure, Ice creep, Ice deformation.

46-3891
Accreted ice density related to thermal and dynamic parameters.
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Prodi, F.
Ice accretion, Ice density, Ice thermal properties, Ice air interface.

46-3892
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Shiraishi, M., Mae, S.
Ice electrical properties, Ice composition, Dielectric properties, Ice temperature, Microwaves, Impurities, Ice crystal structure, Analysis (mathematics).

46-3893
Grain growth in pure ice, effects of mobile bubbles.
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Arena, L.E., Levi, L.
Ice crystal growth, Ice crystal structure, Bubbles, Ice thermal properties, Recrystallization.

46-3894
Mechanical behaviors of polycrystalline ice containing pressurized gas enclosures.
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Maeno, N.
Ice crystal structure, Ice strength, Ice pressure, Bubbles, Gas inclusions, Ice density.

46-3895
High temperature creep of polycrystalline ice under hydrostatic pressure.
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Ice creep, Ice pressure, Ice thermal properties, Ice deformation, Ice strength, Ice crystal structure.

46-3896
Deformation of partially molten KCl-H2O system.
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Kumazawa, M., Kurita, K.
Ice deformation, Ice creep, Ice thermal properties, Ice pressure, Rheology.

46-3897
Heat generation during crushing experiments on freshwater ice.
Gagnon, R.E., Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.447-455, 11 refs.
Ice pressure, Ice thermal properties, Ice breaking, Ice loads, Ice deformation, Ice solid interface, Ice melting.

46-3898
Ice I-II transformation: mechanisms and kinetics under hydrostatic and nonhydrostatic conditions.
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Durham, W., Stern, L.
Ice thermal properties, Ice pressure, Solid phases, Ice crystal growth, Ice crystal structure, Phase transformations, Compressive properties, High pressure ice.

46-3899
Mechanical deformation of polycrystalline ice Ih at temperatures 100 K-263 K: first report.
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Maeno, N.
Ice thermal properties, Ice pressure, Ice deformation, Compressive properties, Ice crystal structure, Ice strength.

46-3900
Electrical signals from cracks in ice.
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Petrenko, V.F., Schulson, E.M.
Ice electrical properties, Ice cracks, Ice deformation, Cracking (fracturing), Ice microstructure.

46-3901
Measurements of the velocity of crack propagation in ice.
Sato, A., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.476-480, 9 refs.
Wakahama, G.
Ice cracks, Crack propagation, Ice deformation, Ice strength, Brittleness.

46-3902
Glide and climb processes of dislocations in ice.
Hondoh, T., Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.481-487, 26 refs.
Ice crystal structure, Ice deformation, Dislocations (materials), Ice thermal properties, Ice pressure, Crystal defects, Analysis (mathematics), X ray analysis.

46-3903
Velocities of dislocations in ice.
Shearwood, C., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.488-491, 16 refs.
Whitworth, R.W.
Ice crystal structure, Ice deformation, Dislocations (materials), Ice thermal properties, X ray analysis.

46-3904
Dislocation multiplication mechanisms in ice.
Ahmad, S., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.492-496, 9 refs.
Shearwood, C., Whitworth, R.W.
Ice crystal structure, Ice deformation, Dislocations (materials), Plastic deformation, X ray analysis.

46-3905
Computer modelling of dislocation glide in ice Ih.
Heggie, M.I., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.497-501, 15 refs.
Maynard, S.C.P., Jones, B.
Ice crystal structure, Ice deformation, Dislocations (materials), Molecular structure, Computerized simulation, Hydrogen bonds.

46-3906
Action of electric fields on plastic deformation of pure and doped ice single crystals.
Petrenko, V.F., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.502-508, 25 refs.
Schulson, E.M.
Ice crystal structure, Ice electrical properties, Ice deformation, Plastic deformation, Dislocations (materials), Molecular structure, Analysis (mathematics), Doped ice.

46-3907
X-ray topographic studies on pressure dependence of sel^{c}-interstitial parameters in ice Ih.
Kinpara, S., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.509-510, 3 refs.
Hondoh, T.
Ice crystal structure, Ice deformation, Ice pressure, X ray analysis, Dislocations (materials).

46-3908
Dislocation mobility for basal glide in ice close to the melting temperature.
Yamakami, H., et al, Physics and chemistry of ice. Edited by N. Maeno and T. Hondoh, Sapporo, Japan, Hokkaido University Press, 1992, p.511-512, 5 refs.
Ice crystal structure, Ice deformation, Dislocations (materials), X ray analysis.

46-3909
Fresh and lightly-mineralized ground water resources in the southern part of the Western Siberian artesian basin. [Resursy presnykh i malomineralizovannykh podzemnykh vod iuzhnoi chasti Zapadno-Sibirskogo arteziianskogo basseina].
Pinneker, E.V., ed. Moscow, Nedra, 1991, 258p., In Russian. 31 refs.
Artesian water, Ground water, Water supply, Hydrogeology, Geocryology, Permafrost hydrology, Water pollution, Meltwater, Snowmelt, Minerals.

46-3910
Geosystem over time. [Geosistema vo vremeni].
Grin, A.M., ed. Moscow, Institut geografii AN SSSR, 1991, 333p. (Pertinent p.179-185). In Russian with English summary and table of contents. Refs. p.309-333.
Kliuev, N.N., ed, Mukhina, L.I., ed.
Glaciation, Paleoclimatology, Limnology, Ecosystems, Glacial deposits, Moraines.

46-3911
***Codes and standards for the design of shunting* systems for railroads in the USSR.** [Pravila i normy proektirovaniia sortirovochnykh ustroistv na zheleznykh dorogakh Soiuza SSR].
Ponomareva, A.N., ed, Moscow, Transport, 1992, 104p., In Russian.
Cold weather operation, Railroad equipment, Design.

46-3912
Thermal insulation of engineering structures in the Far North. [Teplovaia zashchita inzhenernykh sooruzhenii v usloviiakh Krainego Severa].
Kozhevnikov, N.N., Aktual'nye voprosy teplofiziki: energetika i ekologiia; sbornik nauchnykh trudov (Problems in thermophysics: power supply and ecology: collected scientific papers). Edited by V.E. Nakoriakov, Novosibirsk, Institut teplofiziki SO AN SSSR, 1991, p.123-130, In Russian. 2 refs.
Thermal insulation, Structures, Heat transfer.

46-3913
Atmospheric loads of pollutants in USSR territory. Volume 1 (1987-1989 data). [Atmosfernye nagruzki zagriaznialushchikh veshchestv na territorii SSSR. Vypusk 1 (Dannye 1987-1989 gg.)].
Vasilenko, V.N., et al, Moscow, Gidrometeoizdat, 1991, 187p., In Russian. 14 refs.
Air pollution, Atmospheric composition, Snow composition, Snow cover, Snow impurities, Chemical properties, Environmental impact.

46-3914
Avalanche register of the USSR; Siberia and the Far East, 1980-1985. [Kadastr lavin SSSR; Sibir' i Dal'nii Vostok, 1980-1985 gg.].
Kanaev, L.A., ed, Leningrad, Gidrometeoizdat, 1991, 183p., In Russian. Refs. passim.
Avalanches, Avalanche formation, Avalanche mechanics, Avalanche forecasting, USSR—Siberia, USSR—Far East.

46-3915
Distribution of nitrate content in the surface snow of the antarctic ice sheet along the route of the 1990 International Trans-Antarctic Expedition.
Qin, D., et al, *Journal of geophysical research*, May 1, 1992, 97(A5), p.6277-6284, Refs. p.6283-6284.
Zeller, E.J., Dreschhoff, G.A.M.
Snow composition, Solar activity, Ionization.
Information about the geographic distribution of the nitrate fallout over Antarctica was limited to only a few sites. A unique opportunity to examine this aspect of the nitrate distribution and to test more fully the hypothesis that atmospheric ionization from solar-charged particles is responsible for a significant portion of nitrate, was presented by a set of surface snow samples collected by the International Trans-Antarctica Expedition foot traverse. The set of 95 samples of the upper 25 cm was collected at roughly equal distances along the 5736 km route from July 27, 1989, to Mar. 3, 1990. Samples are distributed along a track from 65S, 59.6W, through 90S, to 66.5S, 95.6E, which represents geomagnetic latitudes 50S, west longitude, to 77S, east longitude. The profiles of nitrate concentration and flux along the route were plotted and indicate that (especially at the higher elevation of the polar plateau) the distribution may be affected by electron precipitation. (Auth. mod.)

46-3916
Infrared studies of water adsorption on model organic surfaces.
Nuzzo, R.G., et al, *Journal of physical chemistry*, Feb. 6, 1992, 96(6), p.1355-1361, 31 refs.
Zegarski, B.R., Korenic, E.M., Dubois, L.H.
Amorphous ice, Water structure, Ice physics, Infrared spectroscopy, Adsorption, Phase transformations, Substrates, Temperature effects, Molecular structure, Surface properties.

46-3917
Biological activity of meadow-chernozem permafrost soils.
Nimaeva, S.Sh., *Soviet soil science*, 1991, 23(8), p.67-74, Translated from Pochvovedenie, 1991, No.11. 5 refs.
Soil formation, Chernozem, Permafrost transformation, Vegetation factors, Decomposition, Soil microbiology, Agriculture, Soil science.

46-3918
Potassium conditions of meadow-chernozem permafrost soils of the Buryat ASSR.
Pigareva, N.N., *Soviet soil science*, 1991, 23(9), p.79-84, Translated from Agrokhimiia, 1991, No.5. 13 refs.
Chernozem, Mineralogy, Permafrost, Soil chemistry, Soil analysis, Agriculture, Chemical composition, Nutrient cycle.

46-3919
Evidence for a new phase of water: water II.
Speedy, R.J., *Journal of physical chemistry*, Mar. 5, 1992, 96(5), p.2322-2325, 29 refs.
Water structure, Molecular structure, Liquid cooling, Phase transformations, Thermodynamics, Liquid phases, Cryogenics, Heat capacity, Temperature effects, Stability.

46-3920
Nutrient and biogenic particulate distributions, primary productivity and nitrogen uptake in the Weddell-Scotia Sea marginal ice zone during winter.
Cota, G.F., et al, *Journal of marine research*, Feb. 1992, 50(1), p.155-181, 52 refs.
Ice edge, Plankton, Sea ice, Sea water, Chemical composition, Antarctica—Weddell Sea, Scotia Sea.
During austral winter of 1988, the distributions of inorganic nutrients and particulate materials as well as primary productivity and rates of nutrient uptake in the upper 150 m of the marginal ice zone of the Weddell-Scotia Sea were determined. Nutrient concentrations were high and particulate matter levels were low throughout the study area, but occasionally nutrient minima and particulate maxima occurred near the ice edge associated with warm-core eddies. Chlorophyll concentrations and primary productivity averaged 0.12 microgram l and 32 mg C/sq m/d, respectively. Surface growth rates calculated from carbon uptake and total particulate organic carbon were very low, but living phytoplankton only comprised about 10% of the POC in the surface layer. Thus, mean phytoplankton growth rates appear to have been between 0.1 and 0.2 doublings/d. Although nitrate was about 40 times as abundant as ammonium, ammonium was consistently the preferred substrate of the plankton assemblages, accounting for over half of the nitrogen taken up. Paired samples from the same depth and vertically integrated *f*-ratios averaged 0.43. Both ammonium and nitrate were removed at rates that individually exceeded the apparent nitrogen demand of the phytoplankton, implying significant heterotrophic uptake of inorganic nitrogen. (Auth. mod.)

46-3921
Experimental studies on the thermal regime of a coal mine prepared for mining along the Neryungrinskiy profile. [Eksperimental'nye issledovaniia temperaturnogo rezhima ugol'nogo massiva, podgotavlivaemogo k vyemke na razreze "Neriungrinskii"].
Ivanov, E.S., et al, Gazopyleelektrobezopasnost' gornykh rabot (Gas-dust-electrical safety in mining operations). Edited by D.M. Bronnikov, Moscow, IPKON AN SSSR, 1990, p.76-85, In Russian. 4 refs.
Kudriashov, V.V., Umantsev, R.F., Shurinova, M.K.
Mine shafts, Mining, Thermal regime, Permafrost thermal properties, Frozen ground temperature, Frozen ground thermodynamics, Analysis (mathematics).

46-3922
Proceedings.
International Symposium: Wheat Breeding: Prospects and Future Approaches, Albena, Bulgaria, June 4-8, 1990, Bulgaria, Agricultural Academy, 1990, 400p., Refs. passim. For selected papers see 46-3923 through 46-3933.
Panayotov, I., ed, Pavlova, S., ed.
Frost resistance, Plant physiology, Plants (botany), Cold tolerance.

46-3923
Frost resistance studie ith wheat in natural and artificial conditions.
Veisz, O., et al, International Symposium: Wheat Breeding: Prospects and Future Approaches, Albena, Bulgaria, June 4-8, 1990, Proceedings. Edited by I. Panayotov and S. Pavlova, Bulgaria, Agricultural Academy, 1990, p.12-17.
Sutka, J.
Frost resistance, Plant physiology, Plants (botany), Cold tolerance.

46-3924
Breeding of intensive type durum winter wheat varieties to increase adaptation potential.
Palamarchuk, A., International Symposium: Wheat Breeding: Prospects and Future Approaches, Albena, Bulgaria, June 4-8, 1990, Proceedings. Edited by I. Panayotov and S. Pavlova, Bulgaria, Agricultural Academy, 1990, p.71-75, 17 refs.
Plants (botany), Plant physiology, Frost resistance, Cold tolerance.

46-3925
Wheat Fusariose in the South Ukraine and variety resistance.
Babaiants, L., et al, International Symposium: Wheat Breeding; Prospects and Future Approaches, Albena, Bulgaria, June 4-8, 1990. Proceedings. Edited by I. Panayotov and S. Pavlova, Bulgaria, Agricultural Academy, 1990, p.145-146.
Klechkovskaia, E., Gontarenko, O.
Plant physiology, Plants (botany), Cold tolerance, Frost resistance.

46-3926
Genetic analysis of water deficit and frost resistance in wheat tissue culture.
Galiba, G., et al, International Symposium: Wheat Breeding; Prospects and Future Approaches, Albena, Bulgaria, June 4-8, 1990. Proceedings. Edited by I. Panayotov and S. Pavlova, Bulgaria, Agricultural Academy, 1990, p.194-206, 2 refs.
Kocsy, G., Sutka, J.
Plants (botany), Plant physiology, Plant tissues, Frost resistance, Cold tolerance.

46-3927
Energy efficiency of winter wheat plant breathing in the period of adaptation and cold impact.
Karmanenko, N.M., International Symposium: Wheat Breeding; Prospects and Future Approaches, Albena, Bulgaria, June 4-8, 1990. Proceedings. Edited by I. Panayotov and S. Pavlova, Bulgaria, Agricultural Academy, 1990, p.260-264.
Plants (botany), Plant physiology, Frost resistance, Cold tolerance.

46-3928
Achievements in wheat breeding at the Institute of Introduction and Plant Resources, with regard to stress climatic factors.
Boyadjieva, D., et al, International Symposium: Wheat Breeding; Prospects and Future Approaches, Albena, Bulgaria, June 4-8, 1990. Proceedings. Edited by I. Panayotov and S. Pavlova, Bulgaria, Agricultural Academy, 1990, p.270-273, 7 refs.
Stankova, P.
Frost resistance, Plant physiology, Plants (botany), Cold tolerance.

46-3929
Winter wheat genotypes reaction on short-term chilling and express diagnostics of plants.
Musich, V., International Symposium: Wheat Breeding; Prospects and Future Approaches, Albena, Bulgaria, June 4-8, 1990. Proceedings. Edited by I. Panayotov and S. Pavlova, Bulgaria, Agricultural Academy, 1990, p.274-277, 11 refs.
Frost resistance, Plant physiology, Plants (botany), Cold tolerance.

46-3930
Breeding value of some wheat cultivars for cold resistance.
Todorov, I., et al, International Symposium: Wheat Breeding; Prospects and Future Approaches, Albena, Bulgaria, June 4-8, 1990. Proceedings. Edited by I. Panayotov and S. Pavlova, Bulgaria, Agricultural Academy, 1990, p.278-286, 18 refs.
Petrova, T., Tsenov, A., Penchev, E.
Frost resistance, Plant physiology, Plants (botany), Cold tolerance, Analysis (mathematics).

46-3931
Physiological-genetic aspects of frost resistance in winter wheat: frost resistance relationship with the genome composition of wheat.
Barashkova, E., et al, International Symposium: Wheat Breeding; Prospects and Future Approaches, Albena, Bulgaria, June 4-8, 1990. Proceedings. Edited by I. Panayotov and S. Pavlova, Bulgaria, Agricultural Academy, 1990, p.357-359, For another version see 46-3933.
Vavilov, N.I.
Frost resistance, Plants (botany), Plant physiology, Cold tolerance.

46-3932
Studies on cold resistance of some new and perspective varieties and lines of winter soft wheat in southeastern Bulgaria.
Petkov, P., et al, International Symposium: Wheat Breeding; Prospects and Future Approaches, Albena, Bulgaria, June 4-8, 1990. Proceedings. Edited by I. Panayotov and S. Pavlova, Bulgaria, Agricultural Academy, 1990, p.374-378, 11 refs.
Lazarov, N., Petkov, S.
Frost resistance, Plant physiology, Plants (botany), Cold tolerance.

46-3933
Physiological-genetic aspects of frost resistance in winter wheat: relationship of frost hardiness with genome composition in wheat.
Barashkova, E., et al, International Symposium: Wheat Breeding; Prospects and Future Approaches, Albena, Bulgaria, June 4-8, 1990. Proceedings. Edited by I. Panayotov and S. Pavlova, Bulgaria, Agricultural Academy, 1990, p.379-384, 9 refs. For another version see 46-3931.
Vavilov, N.I.
Frost resistance, Plant physiology, Plants (botany), Cold tolerance.

46-3934
Equilibrium ice sheet scaling in climate modeling.
Verbitskiĭ, M.IA., *Climate dynamics*, Mar. 1992, 7(2), p.105-110, 23 refs.
Ice sheets, Physical properties, Ice models, Climatology, Glacier oscillation, Snow accumulation, Global warming, Thermodynamics, Mathematical models, Sea level.
A set of simple scaling formulas related to ice sheet evolution is derived from the dynamic and thermodynamic equations for ice and is used to consider two common situations: (a) the estimation of potential ice sheet characteristics given the prescribed net snow accumulation over an area; and (b) the reconstruction of net snow accumulation and vertical temperature difference within the ice sheet, given empirical data only concerning ice sheet area and volume. The scaling formulas are applied to the present day antarctic and Greenland ice sheets, as well as to some ancient ice sheets, and are used to estimate the potential global sea level change due to greenhouse warming. (Auth. mod.)

46-3935
Geomorphic implications of glacier outburst flooding: Noeick River valley, British Columbia.
Desloges, J.R., et al, *Canadian journal of earth sciences*, Mar. 1992, 29(3), p.551-564, With French summary. 41 refs.
Church, M.
Lake bursts, Glacial lakes, Flooding, Geomorphology, Floodplains, Water erosion, Sediment transport, Watersheds, Channels (waterways).

46-3936
Submarine sedimentary features on a fjord delta front, Queen Inlet, Glacier Bay, Alaska.
Carlson, P.R., et al, *Canadian journal of earth sciences*, Mar. 1992, 29(3), p.565-573, With French summary. 19 refs.
Powell, R.D., Phillips, A.C.
Deltas, Geomorphology, Marine deposits, Outwash, Sediment transport, Bottom sediment, Acoustic measurement, Glacier melting, Turbidity, Bottom topography.

46-3937
Role of passive microwaves in characterizing snow cover in the Colorado River basin.
Chang, A.T.C., et al, *GeoJournal*, Mar. 1992, 26(3), p.381-388, 17 refs.
Foster, J.L.
Snow cover distribution, Snow water equivalent, Remote sensing, Radiometry, Statistical analysis, River basins, Snow surveys, Runoff forecasting, Microwaves, Grain size, Correlation.

46-3938
Some principles of separating and correlating moraine masses in plain ice sheet.
Zol'nikov, I.D., *Soviet geology and geophysics*, 1991, 32(1), p.73-76, Translated from Geologiia i geofizika. 12 refs.
Glacial geology, Glaciation, Quaternary deposits, Moraines, Sediment transport, Mudflows, Paleoclimatology, Correlation.

46-3939
Combined analytical-experimental tensile test technique for brittle materials.
Chu, M.L., et al, *Experimental techniques*, Jan.-Feb. 1992, 16(1), p.46-50, 11 refs.
Scavuzzo, R.J., Srivatsan, T.S.
Ice strength, Ice accretion, Mechanical tests, Laboratory techniques, Tensile properties, Brittleness, Ice solid interface, Aircraft icing, Ice removal, Ultimate strength.

46-3940
Jan Mayen Current of the Greenland Sea.
Bourke, R.H., et al, *Journal of geophysical research*, May 15, 1992, 97(C5), p.7241-7250, 17 refs.
Paquette, R.G., Blythe, R.F.
Ocean currents, Hydrography, Ice cover effect, Convection, Surface waters, Salinity, Oceanographic surveys, Periodic variations.

46-3941
Structure and dynamics of the Sea of Okhotsk marginal ice zone from "Ocean" satellite radar sensing data.
Mitnik, L.M., et al, *Journal of geophysical research*, May 15, 1992, 97(C5), p.7429-7445, 31 refs.
Kalmykov, A.I.
Sea ice distribution, Spaceborne photography, Ice conditions, Side looking radar, Ice edge, Radar photography, Image processing.

46-3942
Chemical composition of falling snow at Dumont d'Urville, Antarctica.
Maupetit, F., et al, *Journal of atmospheric chemistry*, Apr. 1992, 14(1-4), p.31-42, 26 refs.
Delmas, R.J.
Snow composition, Marine atmospheres, Sampling, Falling snow, Atmospheric composition, Scavenging, Aerosols, Air pollution, Chemical composition, Ion density (concentration), Antarctica Dumont d'Urville Station.
Fourteen samples of fresh falling snow were collected at antarctic coastal base Dumont d'Urville in 1984. The samples have been analyzed for major ions by ion chromatography and acid titration. The results are relevant to the chemical composition of background precipitation in polar marine conditions. The seasalt aerosol contribution is dominant. The calculated non-seasalt sulfate concentration is significantly negative for 9 of the 14 samples. Non-seasalt sulfate is found to be relatively high in summer and fall. Methane sulfonic acid also exhibits the same pattern, probably linked to local marine biogenic activity and/or atmospheric photochemical processes. The methane sulfonic acid to non-seasalt sulfate ratio is in good agreement with values reported for coastal antarctic ice cores and subantarctic aerosol. The background mean value for nitrate concentration is 1.1 microgram energy equivalent / but two very strong spikes are observed. The first seems to be linked with long range transport of continental air masses while the second (in winter) is clearly due to a sudden input of nitric acid, possibly from the stratosphere. This paper represents a preliminary approach to a larger air and snow monitoring to be developed at this site. (Auth. mod.)

46-3943
Comments on the origin of dust in East Antarctica for present and ice age conditions.
Gaudichet, A., et al, *Journal of atmospheric chemistry*, Apr. 1992, 14(1-4), p.129-142, 23 refs.
Ice sheets, Ice cores, Drill core analysis, Marine atmospheres, Clay minerals, Pleistocene, Atmospheric composition, Aerosols, Simulation, Dust, Paleoclimatology, Antarctica Byrd Station.
In this paper, the distribution of 327 clay mineral particles retrieved from four antarctic ice samples corresponding to present and Last Glacial Maximum (LGM) climate conditions were studied. Illite, chlorite, smectite and kaolinite were identified in all samples. Focusing on kaolinite, because of its use as a possible tracer of low latitude soils, a significantly smaller amount for LGM samples was found, while the dust concentration in snow during the LGM was about 30 times higher than for present climate conditions. This can be interpreted as change in the contribution of the Australian source with climate. A second approach was based on the modeling of the desert dust cycle using an Atmospheric General Circulation Model (AGCM) under both present-day and ice age conditions. Unlike mineralogical results, the model suggests the prevalence of the Australian dust source in the deposits over East Antarctica under both present-day and LGM climate conditions. However the model fails to reproduce the strong increase in dust deposits during the LGM. This discrepancy could be partly due to the lack of a higher latitude dust source in the model. The stronger dust input recorded in ice cores for the LGM could be related to an additional active high latitude source (possibly close to South America) overlapping the atmospheric background coming from low latitude areas. (Auth. mod.)

46-3944
***Initial findings of recent investigations of air-snow* relationships in the Summit region of the Greenland ice sheet.**
Dibb, J.E., et al, *Journal of atmospheric chemistry*, Apr. 1992, 14(1-4), p.167-180, 28 refs.
Jaffrezo, J.L., Legrand, M.
Ice sheets, Snow accumulation, Ice cores, Drill core analysis, Snow air interface, Aerosols, Snow composition, Atmospheric composition, Ion density (concentration), Radioactive isotopes.

46-3945
Nitrogen and sulfur species in aerosols at Mawson, Antarctica, and their relationship to natural radionuclides.
Savoie, D.L., et al, *Journal of atmospheric chemistry*, Apr. 1992, 14(1-4), p.181-204, Refs. p.202-204.
Prospero, J.M., Larsen, R.J., Saltzman, E.S.
Polar atmospheres, Marine atmospheres, Atmospheric composition, Aerosols, Ice cores, Sampling, Seasonal variations, Chemical composition, Antarctica Mawson Station.
High volume aerosol samples were collected continuously at Mawson Station from Feb. 1987 through Oct. 1989. All samples

were analyzed for Na+, Cl-, SO4=, NO3-, methanesulfonate (MSA), NH4+, Be-7, and Pb-210. The annual mean concentrations of many of the species are substantially lower than even those over the relatively pristine regions of the tropical and subtropical South Pacific. The concentrations at Mawson are comparable both in magnitude and in seasonality to those which have been measured in long term studies at the South Pole and at the coastal German antarctic research station, Georg von Neumayer. This comparability suggests that the aerosol composition may be relatively uniform over a broad sector of the Antarctic. The concentrations of most of the species exhibit very strong and sharply-defined seasonal cycles. These results indicate that the major source of NO3- over Antarctica is probably of continental as opposed to stratospheric or marine biogenic origin. (Auth. mod.)

46-3946

Variations in heavy metals concentrations in antarctic snows from 1940 to 1980.

Görlach, U., et al, *Journal of atmospheric chemistry*, Apr. 1992, 14(1-4), p.205-222, 29 refs.

Boutron, C.F.

Snow impurities, Air pollution, Snow composition, Sampling, Metals, Periodic variations, Correlation, Antarctica—Adélie Coast.

Concentrations of Pb, Cd, Cu and Zn have been measured using improved ultraclean procedures in a succession of 26 snow samples integrating a 40 yr time sequence from 1940 to 1980. Samples were collected from the walls of a 6 m deep pit at stake D 55 in Adelie Land, East Antarctica. Measured concentrations, which are among the lowest ones ever measured in antarctic snows, are found not to have significantly increased during the investigated time period, with the possible exception of Pb, for which there might have been a significant increase after the mid 1960's. For this last metal, measured concentrations in the 1940's are about 6-fold higher than in antarctic Holocene ice several thousand years old, which indicates that a large fraction of the anthropogenic increase for Pb probably occurred before the 1940's. (Auth. mod.)

46-3947

Gas phase measurements of hydrogen peroxide in Greenland and their meaning for the interpretation of H2O2 records in ice cores.

Sigg, A., et al, *Journal of atmospheric chemistry*, Apr. 1992, 14(1-4), p.223-232, 31 refs.

Staffelbach, T., Neftel, A.

Atmospheric composition, Vapor transfer, Sampling, Snow air interface, Scavenging, Ice cores, Firn, Chemical composition, Periodic variations, Ice sheets.

46-3948

Sources of continental dust over Antarctica during the last glacial cycle.

De Angelis, M., et al, *Journal of atmospheric chemistry*, Apr. 1992, 14(1-4), p.233-244, 18 refs.

Barkov, N.I., Petrov, V.N.

Ice sheets, Ice cores, Mineralogy, Aerosols, Paleoclimatology, Drill core analysis, Dust, Antarctica—Vostok Station.

The soluble and insoluble parts of 4 major components (Al, Ca, K and Mg) of the continental dust input over East Antarctica, as well as size distribution parameters of the insoluble part of this dust, have been studied along an ice core which spans the last climatic cycle (160 kyr). These results provide a better understanding of the respective impact of the different potential dust sources. While Al and K were probably entrapped in illite originating from arid areas and in a lesser extent from shallow marine sediments, Ca and Mg inputs were dominated by marine carbonate of exposed continental shelves emissions. (Auth.)

46-3949

Spatial and temporal variations of methanesulfonic acid and non-sea salt sulfate in antarctic ice.

Legrand, M., et al, *Journal of atmospheric chemistry*, Apr. 1992, 14(1-4), p.245-260, 25 refs.

Feniet-Saigne, C., Saltzman, E.S., Germain, C.

Atmospheric composition, Polar atmospheres, Aerosols, Ice sheets, Ice cores, Marine atmospheres, Air water interactions, Salinity, Chemical properties, Climatic factors, Antarctica—Vostok Station.

A simultaneous glaciochemical study of methanesulfonic acid (MSA) and non-seasalt sulfate has been conducted on the antarctic plateau (South Pole, Vostok) and in more coastal regions. The objective was to investigate marine sulfur emissions in very remote areas. Firstly, these data suggest that MSA and non-seasalt sulfate present in antarctic ice are mainly marine in origin and that dimethylsulfide (DMS) emissions have been significantly modulated by short term (e.g. El Nino Southern Oscillation events) as well as long term climatic changes in the past. Secondly, study of spatial variations of these two sulfur species seems to indicate that the atmosphere of coastal antarctic regions are mainly supplied by local DMS emissions whereas the atmosphere of the high plateau is also influenced by DMS emissions from more temperate marine latitudes. Thirdly, study of the partitioning between MSA and non-seasalt sulfate suggests that the temperature could have been an important parameter controlling the final composition of the high southern latitude atmosphere over the last climatic cycle, colder temperature favoring the formation of MSA. However these data also support a possible role played by changes in the transport pattern of marine air to the high antarctic plateau. (Auth. mod.)

46-3950

Free tropospheric reservoir of natural sulfate.

Delmas, R.J., *Journal of atmospheric chemistry*, Apr. 1992, 14(1-4), p.261-271, 41 refs.

Polar atmospheres, Ice cores, Atmospheric composition, Aerosols, Snow composition, Volcanic ash, Boundary layer, Isotope analysis, Chemical properties, Antarctica—Vostok Station.

Be-10 is used as a spike of the natural background atmospheric aerosol to calculate the global flux of sulfur (Fs) into the free troposphere. The sulfate and Be-10 concentrations determined in polar snow are compared. On the basis of an annual Be-10 production rate of 1.21 10 million at./sq cm, a very low figure of 2.9 Tg S/a is calculated for Fs, which suggests that most of the sulfur emitted at ground level remains in the boundary layer. The role of carbonylsulfide in the upper tropospheric sulfur budget is reviewed. It is also shown that cataclysmic volcanic eruptions may disturb considerably for 1-2 years this vast background tropospheric sulfur reservoir. Three antarctic sites were among sources of ice cores for analysis of snow chemistry. (Auth. mod.)

46-3951

Influence of sea ice distribution on the atmospheric boundary layer.

Wefelmeier, C., et al, *Zeitschrift für Meteorologie*, 1991, 41(5), p.333-342, With German summary. 30 refs.

Etling, D.

Sea ice distribution, Ice cover effect, Ice heat flux, Ice air interface, Turbulent boundary layer, Ice edge, Marine atmospheres, Wind factors, Mathematical models, Surface roughness.

46-3952

Climatic changes and aerosol transport in the Antarctic and Arctic. (Klimaschwankungen und Aerosoltransport in der Antarktis und Arktis).

Leiterer, U., *Zeitschrift für Meteorologie*, 1991, 41(5), p.343-349, In German with English summary. 15 refs.

Polar atmospheres, Climatic changes, Ice cores, Aerosols, Carbon dioxide, Atmospheric circulation, Pleistocene, Periodic variations, Antarctica—Vostok Station.

In the first part of this paper, possible reasons for climatic changes during the last 160,000 years are discussed. For the explanations of climatic changes, the information of the 2083 m ice core obtained by Soviet Antarctic Expeditions at Vostok Station is used. The investigations carried out by a French-Soviet team provide quantitative results of prior changes of the snow-surface temperature, CO2 and aerosol concentration. In the second part of the paper, peculiarities of the large scale antarctic circulation and the physical properties of the aerosol are described. Some aspects of recent climate changes in the Arctic are also discussed. (Auth. mod.)

46-3953

Concentration difference heat pump using fusion and freezing processes.

Mulyono, P., et al, *Solar energy*, 1992, 48(3), p.177-184, 9 refs.

Honda, T., Kanzawa, A.

Refrigeration, Liquid cooling, Ice makers, Ice water interface, Heat transfer, Solutions, Phase transformations, Air conditioning, Solar radiation.

46-3954

Ablation arc: 3. Spectrum analysis of the ablation-stabilized arcs in ice.

Cao, L.J., et al, *Journal of physics D: applied physics*, Apr. 14, 1992, 25(4), p.669-676, 18 refs.

Stokes, A.D.

Ice spectroscopy, Radiation absorption, Electrical resistivity, Exploding wires, Charge transfer, Spectra, High pressure tests, Ablation, Ice electrical properties.

46-3955

Differential scanning calorimetric study of frozen sucrose and glycerol solutions.

Ablett, S., et al, *Chemical Society, London. Faraday transactions*, Mar. 21, 1992, 88(6), p.789-794, 25 refs.

Izzard, M.J., Lillford, P.J.

Solutions, Frozen liquids, Temperature measurement, Phase transformations, Heat capacity, Thermal analysis, Thermodynamics, Accuracy, Temperature effects.

46-3956

Modelling of heat capacity-temperature data for sucrose-water systems.

Ablett, S., et al, *Chemical Society, London. Faraday transactions*, Mar. 21, 1992, 88(6), p.795-802, 12 refs.

Clark, A.H., Izzard, M.J., Lillford, P.J.

Solutions, Liquid cooling, Ice melting, Phase transformations, Heat capacity, Temperature measurement, Accuracy, Thermodynamics, Temperature effects, Simulation.

46-3957

Why is snow so bright.

Koenderink, J.J., et al, *Optical Society of America A. Journal*, May 1992, 9(5), p.643-648, 20 refs.

Richards, W.A.

Snow optics, Snow cover, Brightness, Radiance, Visibility, Cloud cover, Photometry, Human factors

46-3958

Determination of major ions in snow and ice cores by ion chromatography.

Buck, C.F., et al, *Journal of chromatography*, Mar 6, 1992, 594(1-2), p.225-228, 12 refs.

Snow composition, Ice cores, Ion density (concentration), Chemical analysis, Sampling, Paleoclimatology, Laboratory techniques.

46-3959

Winter oceanographic conditions in the Fram Strait-Yermak Plateau region.

Muench, R.D., et al, *Journal of geophysical research*, Mar. 15, 1992, 97(C3), p.3469-3483, 21 refs.

Ocean currents, Hydrography, Drift stations, Water temperature, Temperature distribution, Marine atmospheres, Icebergs, Oceanographic surveys.

46-3960

Surface-based passive microwave studies of multiyear sea ice.

Grenfell, T.C., *Journal of geophysical research*, Mar. 15, 1992, 97(C3), p.3485-3501, 28 refs.

Sea ice, Surface properties, Radiometry, Thermal radiation, Scattering, Ice optics, Snow cover effect, Spectra, Classifications, Microwaves.

46-3961

Changes in ice cover thickness and lake level of Lake Hoare, Antarctica: implications for local climatic change.

Wharton, R.A., Jr., et al, *Journal of geophysical research*, Mar. 15, 1992, 97(C3), p.3503-3513, 27 refs.

Lake ice, Meltwater, Ice cover thickness, Climatic changes, Seasonal ablation, Water level, Air temperature, Global warming, Ice water interface, Glacier melting, Antarctica—Hoare, Lake.

This paper reports results from 10 years of ice thickness measurements at perennially ice-covered Lake Hoare in southern Victoria Land. The ice cover of this lake had been thinning steadily at a rate exceeding 20 cm/yr during the last decade but seems to have recently stabilized at a thickness of 3.3 m. Data concerning lake level and degree-days above freezing are presented to show the relationship between peak summer temperatures and the volume of glacier-derived meltwater entering Lake Hoare each summer. From these latter data it is inferred that peak summer temperatures have been above 0 C for a progressively longer period of time each year since 1972. Also considered are possible explanations for the thinning of the lake ice. The thickness of the ice cover is determined by the balance between freezing during the winter and ablation that occurs all year but maximizes in summer. It is suggested that the factor most likely responsible for the change in the ice cover thickness at Lake Hoare is the extent of summer melting, consistent with the rising lake levels. (Auth. mod.)

46-3962

Sizes, frequencies, and freeboards of East Greenland icebergs observed using ship radar and sextant.

Dowdeswell, J.A., et al, *Journal of geophysical research*, Mar. 15, 1992, 97(C3), p.3515-3528, 29 refs.

Whittington, R.J., Hodgkins, R.

Sea ice distribution, Drift, Icebergs, Physical properties, Radar tracking, Measurement, Estuaries, Calving, Oceanographic surveys, Glacial hydrology.

46-3963

Impact of snow cover on diurnal temperature range.

Cerveny, R.S., et al, *Geophysical research letters*, Apr. 24, 1992, 19(8), p.797-800, 29 refs.

Balling, R.C., Jr.

Air temperature, Diurnal variations, Snow cover effect, Snow cover distribution, Climatic factors, Temperature variations, Statistical analysis, Global warming.

46-3964

Inter-hemispheric transport of volcanic ash from a 1259 A.D. volcanic eruption to the Greenland and antarctic ice sheets.

Palais, J.M., et al, *Geophysical research letters*, Apr. 24, 1992, 19(8), p.801-804, 23 refs.

Germani, M.S., Zielinski, G.A.

Ice sheets, Ice cores, Volcanic ash, Aerosols, Drill core analysis, Atmospheric circulation, Correlation, Scanning electron microscopy, Antarctica, Amundsen-Scott Station.

A strong volcanic sulfuric acid signal corresponding to an age of 1259 A.D. has been reported in ice cores from Greenland, Antarctica, and arctic Canada. Tiny (< 5 micrometers) volcanic glass shards were reported previously in samples from this layer in an ice core from the South Pole. Here the discovery of volcanic glass shards from a contemporaneous layer in an ice core from Summit, Greenland is reported. The major element composition of the glass shards in the Greenland sample are

identical to those from the South Pole, confirming the previous assumption that the sulfuric acid signal in the ice cores is an inter-hemispheric time stratigraphic marker. The composition of these glass shards is similar to those produced by a 550-700 yrs. B.P. eruption of El Chichon volcano in Mexico, suggesting that it may be the source of the widely dispersed material. (Auth. mod.)

46-3965
Field observation and research of sorted circle mechanism in subantarctic periglacial environment, Antarctica.
Xiong, H., et al, *Antarctic research (Chinese edition)*, Dec. 1991, 3(4), p.1-10, In Chinese with English summary. 5 refs.
Cui, Z.
Periglacial processes, Freeze thaw cycles, Frost action, Geocryology, Antarctica—King George Island.
During a study of sorted circle mechanism, carried out on King George I. in 1989-1990, the relationship between the gravel size of the sorted circle edge and slope was determined. It was found that the circles developed well and in great numbers when the edge gravel size was under 15 cm. The small gravel distributed on the surface of the circle center moved to the edge during the freeze-thaw season, and back to the center during the thaw season (summer). The general displacement was toward the edge. The frost heaving of the surface layer was greater than that of the deeper layer in the sorted circle center. (Auth. mod.)

46-3966
Surface flow of Nelson ice cap, West Antarctica.
Liu, C., et al, *Antarctic research (Chinese edition)*, Dec. 1991, 3(4), p.11-17, In Chinese with English summary. 5 refs.
Qin, D., Wang, X., Qian, S.
Ice cover, Glacier flow, Flow rate, Ice surface, Strain tests, Antarctica—Nelson Island.
Based on analysis of the spatial distribution and seasonal variations of the surface flow velocities of the Nelson ice cap, and the non-verticality between the flow vector and the contour at the same point, the strain-rates are explained along profiles N and E through the highest point on the ice cap surface and the relation between the strain rates and crevasses. These characteristics are compared with those of continental ice caps in China to illustrate the marine features of Nelson ice cap in glacier dynamics. Results of velocity measurements and strain-rate tests are discussed and illustrated.

46-3967
Characteristics of stratigraphy and glaciochemistry on top of the Nelson ice cap, Antarctica.
Qin, D., *Antarctic research (Chinese edition)*, Sep. 1991, 3(3), p.1-7, In Chinese with English summary. 14 refs.
Snow composition, Snow impurities, Snow surface, Air masses, Human factors, Antarctica—Nelson Island.
Snow stratigraphy, seasonal variations, and analysis of ionic concentrations found in samples collected in a snow pit on top of the Nelson ice cap, show that the precipitation impurity concentrations over Nelson I. are higher than those found on the continent. It is suggested that the high concentration of ions on Nelson I. points to environmental pollution caused by human activities, and that the atmospheric processes over the island play an important role in the deposition rate of nitrate, which is similar to that found in other areas of West Antarctica.

46-3968
Snow accumulation and melting processes at the Great Wall Station, Antarctica.
Chen, S., et al, *Antarctic research (Chinese edition)*, Sep. 1991, 3(3), p.8-14, In Chinese with English summary. 5 refs.
Zhang, Y.
Snow accumulation, Snow melting, Snow air interface, Heat flux, Snow density, Antarctica—Great Wall Station.
The onset of snow accumulation at the Great Wall Station takes place between Apr. and June, and ends between middle of Aug. and Oct. The maximum thickness of snow cover recorded in 1985, 1986 and 1988 was 1.9 m, 2.2 m and 1.2 m, respectively. The distribution and temperature profiles of snow cover from the top of a hill to the low tide line show that the thickness of snow cover was greatest in the low-lying land; the thickness at the low tide line was 20 cm greater than that at the high tide line; the snow temperature at 20 cm was -0.10 C, and in the lower layers it ranged from -0.23 to -2.10 C. The day-to-day variation of air-snow sensible heat flux from Nov. 15, 1988 to Jan. 5, 1989, is shown in a figure. The snow density measured in early Dec., 1988, at the depths of 0.05-0.10 m, 0.23-0.28 m, 0.33-0.38 m and 0.55-0.60 m was 0.47 g/cu cm, 0.47 g/cu cm, 0.51 g/cu cm and 0.50 g/cu cm, respectively.

46-3969
Environment record comparison of Chinese loess with antarctic ice core for the past 150,000 years.
Kang, J., et al, *Antarctic research (Chinese edition)*, Sep. 1991, 3(3), p.15-24, In Chinese with English summary. 22 refs.
Li, J.
Ice cores, Paleoclimatology, Loess.
Study of similarities and differences in Chinese loess deposits, Vostok ice cores, and deep sea sediments shows that environmental conditions between 60,000 a B.P. and 18,000 a B.P. were remarkably similar in China and Antarctica. Literature on the subject is reviewed.

46-3970
Analysis of periglacio-geomorphic processes on Fildes Peninsula, King George Island, Antarctica.
Zhu, C., et al, *Antarctic research (Chinese edition)*, Sep. 1991, 3(3), p.25-38, In Chinese with English summary. 18 refs.
Cui, Z.J., Xiong, H.G.
Rock glaciers, Periglacial processes, Geocryology, Striations, Electrical resistivity, Antarctica—Fildes Peninsula.
Periglacial-geomorphological processes on Fildes Peninsula, based on repeated surveying, pitting, geoelectrical prospecting, artificial watering, geothermal measurements and sample analyses, and the study of the sediment structural features of rock glacier, talus, sorted circles, debris flower, and striated soil, are discussed. The influence of salty sediments on electrical resistivity and substantial migration are noted. It is found that the rock glacier and striated soil are active in summer. The stone circles are defined as the beach-gravel type, with convex-shaped table, and debris type, with bowl-shaped frost table. It is concluded that the periglacial geomorphology of Fildes Peninsula is typical of that of subantarctic islands. (Auth. mod.)

46-3971
Ecological observations on coloured layer of coastal fast ice in Great Wall Bay, King George Island, Antarctica.
Lu, P., et al, *Antarctic research (Chinese edition)*, Sep. 1991, 3(3), p.56-63, In Chinese with English summary. 22 refs.
Zhang, K.C., Huang, F.P., Watanabe, K.
Marine biology, Colored ice, Fast ice, Ice composition, Algae, Sea ice, Antarctica—King George Island.
Biological and environmental investigations were carried out in the coastal waters off the Great Wall Station from Nov. 17, 1988, to Mar. 3 1989. Fast ice covered the inner part of the Great Wall Bay until mid Dec.; its thickness ranged from 90 to 70 cm, with about 20 cm of snow cover. An ice core sample collected on Nov. 20 showed a 5-cm brown layer in its middle section. Two brown layers were found in the interior of ice cores collected on Nov. 17, 20 and 26 at a second site. Compared to the water column, chlorophyll *a* concentrations in the fast ice were higher; they ranged from 2.55 to 56.84 mg/cu m. Microalgal assemblages, both in the fast ice and in the water column of the Great Wall Bay, are reported. Their species and relative abundance are shown in a table. (Auth. mod.)

46-3972
Analysis of some characteristics of solar radiation at Zhongshan Station, Antarctica.
Wang, G., et al, *Antarctic research (Chinese edition)*, Sep. 1991, 3(3), p.64-68, In Chinese with English summary. 3 refs.
Xiong, X.
Ultraviolet radiation, Cloud cover, Meteorological data, Antarctica—Zhongshan Station.
Observations of solar radiation at Zhongshan Station were carried out during Jan.-Feb. 1990, using an automatic spectral pyranometer model TBQ-4. Measurements and some characteristics of radiation, such as the mean diurnal variations of total radiation, near infrared, visible radiation, and ultraviolet radiation in clear-sky and cloudy-sky conditions, are discussed and illustrated. (Auth. mod.)

46-3973
Contrasting response of South Greenland glaciers to recent climatic change.
Warren, C.R., et al, *Arctic and alpine research*, May 1992, 24(2), p.124-132, 38 refs.
Glasser, N.F.
Glacier oscillation, Climatic changes, Geomorphology, Calving, Topographic effects, Glacier surveys, Icebergs, Periodic variations.

46-3974
Snow distribution and heat flow in the taiga.
Sturm, M., *Arctic and alpine research*, May 1992, 24(2), MP 3086, p.145-152, 22 refs.
Taiga, Snow cover distribution, Snow cover effect, Forest canopies, Heat loss, Trees (plants), Topographic effects, Soil temperature, Water storage, Watersheds.
The taiga forest covers vast areas of Alaska, Canada, Siberia, and Scandinavia. Winter lasts 6 to 8 months of the year, so the forest is snow covered more often than not. The trees of the forest intercept falling snow and cause it to become distributed in an uneven fashion. Beneath spruce trees (conifers), the snow cover is depleted and a bowl-shaped depression (a tree well) forms. Around aspen and birch (deciduous trees), a cone-shaped accumulation of snow forms. Postdepositional metamorphic processes accentuate this irregular snow distribution. The snow cover, in its undisturbed state, insulates and protects the underlying ground from the extremely low temperatures that occur during the boreal winter. However, this protection can be less effective when the snow cover has been modified by the trees. In this paper, the distribution of snow beneath the trees of the taiga forest is examined, and the effect of the uneven distribution on the winter heat loss from the ground is discussed.

46-3975
Hydrochemical fluxes in a high arctic wetland basin during spring snowmelt.
Buttle, J.M., et al, *Arctic and alpine research*, May 1992, 24(2), p.153-164, 25 refs.
Fraser, K.E.
Wetlands, Hydrogeochemistry, Snow hydrology, Snowmelt, Ion diffusion, Runoff, Chemical properties, Nutrient cycle, Periodic variations.

46-3976
Development of ice-made ramparts on Lake Kussharo, Hokkaido, Japan.
Sasaki, T., *Arctic and alpine research*, May 1992, 24(2), p.165-172, 42 refs.
Lake ice, Shoreline modification, Ice pileup, Lacustrine deposits, Ice rafting, Sediment transport, Coastal topographic features, Shore erosion, Grounded ice.

46-3977
Ground-penetrating radar study of Goodream palsas, Newfoundland, Canada.
Doolittle, J.A., et al, *Arctic and alpine research*, May 1992, 24(2), p.173-178, 39 refs.
Hardisky, M.A., Black, S.
Frost mounds, Subsurface investigations, Radar echoes, Stratigraphy, Sounding, Soil structure, Computer applications, Landforms, Geophysical surveys.

46-3978
Within-population variation in autumn frost hardiness and its relationship to bud-set and height growth in *Picea abies*.
Skröppa, T., *Scandinavian journal of forest research*, 1991, 6(3), p.353-363, 29 refs.
Trees (plants), Frost resistance, Growth, Damage, Cold tolerance, Cold weather tests, Temperature effects, Forestry.

46-3979
Concentrations of cadmium, lead and copper in atmospheric precipitation in Czechoslovakia.
Král, R., et al, *Science of the total environment*, Jan. 15, 1992, 111(2-3), p.125-133, 7 refs.
Mejstřík, V., Velická, J.
Precipitation (meteorology), Air pollution, Sampling, Atmospheric composition, Hoarfrost, Snow impurities, Metals, Periodic variations, Atmospheric circulation.

46-3980
Evidence for the importance of intermolecular coupling in the OD band's vibrational structure in deeply supercooled liquid D2O.
Hare, D.E., et al, *Chemical physics letters*, Mar. 20, 1992, 190(6), p.605-608, 19 refs.
Sorensen, C.M.
Heavy water, Deuterium oxide ice, Supercooling, Liquid cooling, Molecular structure, Spectra, Hydrogen bonds, Vibrations, Molecular energy levels.

46-3981
Model of net radiation over suburban snowpacks.
Todhunter, P.E., et al, *Atmospheric environment*, Mar. 1992, 26B(1), p.17-27, 45 refs.
Xu, F., Buttle, J.M.
Snowmelt, Snow heat flux, Buildings, Microclimatology, Topographic effects, Radiation balance, Insolation, Mathematical models, Heat loss, Snow hydrology.

46-3982
Winter and early spring microclimate of a subalpine spruce-fir forest canopy in central New Hampshire.
Friedland, A.J., et al, *Atmospheric environment*, May 1992, 26A(7), p.1361-1369, 37 refs.
Boyce, R.L., Webb, E.T.
Forest canopy, Microclimatology, Freezing, Damage, Trees (plants), Temperature variations, Cold weather survival, Meteorological factors.

46-3983
Stable isotopes and planktonic trophic structure in arctic lakes.
Kling, G.W., et al, *Ecology*, Apr. 1992, 73(2), p.561-566, 32 refs.
Fry, B., O'Brien, W.J.
Limnology, Plankton, Lake water, Isotope analysis, Ecology, Nutrient cycle, Biomass.

46-3984
Infrared polarization signature from cirrus clouds.
Takano, Y., et al, *Applied optics*, Apr. 20, 1992, 31(12), p.1916-1919, 6 refs.
Liou, K.N.
Cloud physics, Ice crystal optics, Infrared radiation, Polarization (waves), Radiance, Remote sensing, Atmospheric physics, Light scattering, Temperature effects.

46-3985
Evaluation of community and ecosystem monitoring parameters at a high-elevation, Rocky Mountain study site.
Bruns, D.A., et al. *Environmental toxicology and chemistry*, 1992, 11(4), p.459-472, 44 refs.
Wiersma, G.B., Minshall, G.W.
Forest ecosystems, Air pollution, Monitors, Standards, Environmental impact, Atmospheric composition, Global change.

46-3986
Effect of deicing salts on metal and organic matter mobilization in roadside soils.
Amrhein, C., et al. *Environmental science & technology*, Apr. 1992, 26(4), p.703-709, 31 refs.
Strong, J.E., Mosher, P.A.
Road maintenance, Ice removal, Salting, Soil pollution, Runoff, Leaching, Environmental impact, Soil analysis, Metals.

46-3987
***On the anomalous freezing and melting of solvent* crystals in swollen gels of natural rubber.**
Jackson, C.L., et al. *Rubber chemistry and technology*, Nov.-Dec. 1991, 64(5), p.760-768, 30 refs.
McKenna, G.B.
Rubber, Polymers, Freezing points, Melting points, Temperature measurement, Liquid solid interfaces, Solutions, Surface energy, Thermodynamic properties.

46-3988
Beaufort Region Environmental Assessment and Monitoring Program (BREAM). Final report for 1990/1991.
ESL Environmental Science Limited Vancouver, B.C., *Canada. Department of Indian and Northern Affairs. Environmental studies*, Mar. 1991, No.67, 416p., With French summary. Refs. passim.
Petroleum industry, Economic development, Regional planning, Environmental impact, Research projects, Exploration, Pipelines, Canada.

46-3989
Yukon Territory snow survey bulletin and water supply forecast, May 15, 1992.
Canada. Indian and Northern Affairs. Water Resources Division, Whitehorse, 1992, 27p.
Snow surveys, Snow water equivalent, Runoff forecasting, Canada—Yukon Territory.

46-3990
Arctic studies at Dartmouth College; a blueprint for the future.
Young, O.R., Hanover, NH, 1987, Var. p.
Organizations, Education, Research projects, Cost analysis.

46-3991
***Review, analysis and validation* of SNOW-ONE-A transmission data.**
Gallery, W.O., et al. MP 3088, Ann Arbor MI, Opti-Metrics, Inc., July 1985, 83p. + append., 15 refs.
Snowfall, Snow optics, Atmospheric attenuation, Visibility, Snowstorms, Military research, Meteorological instruments, Infrared reconnaissance, Analysis (mathematics).

46-3992
Adfreeze and grouted piles in saline permafrost.
Biggar, K.W., Edmonton, University of Alberta, 1991, 342p., Ph.D. thesis. Refs. passim.
Ice adhesion, Frozen ground strength, Saline soils, Pile load tests, Earth fills, Grouting, Frozen ground thermodynamics, Permafrost beneath structures, Foundations, Engineering geology, Analysis (mathematics).

46-3993
Behaviour of *saline* frozen soils.
Hivon, E.G., Edmonton, University of Alberta, 1991, 435p., Ph.D. thesis. Refs. p.270-285.
Saline soils, Frozen ground strength, Soil creep, Unfrozen water content, Permafrost thermal properties, Permafrost physics, Frozen ground thermodynamics, Analysis (mathematics).

46-3994
Environmental geotechnology.
Usmen, M.A., ed. Rotterdam, A.A. Balkema, 1992, 594p., *Proceedings of the Mediterranean Conference* on Environmental Geotechnology, Cesme, Turkey, May 25-27, 1992. Refs. passim. For selected papers see 46-3995 through 46-3997.
Acar, Y.B., ed.
Waste disposal, Environmental protection, Soil pollution, Linings, Freeze thaw tests.

46-3995
Effects of freeze-thaw on clay cover liner performance.
Miller, C.J., et al. Environmental geotechnology. Edited by M.A. Usmen and Y.B. Acar. Rotterdam, A.A. Balkema, 1992, p.205-211, 8 refs.
Lee, J.Y., Menna, J.
Waste disposal, Frozen ground strength, Freeze thaw tests, Frozen ground thermodynamics, Linings, Clay soils, Cold weather performance, Frost resistance.

46-3996
Effects of freezing and thawing on the permeability of compacted clay landfill covers and liners.
Zimmie, T.F., et al. Environmental geotechnology. Edited by M.A. Usmen and Y.B. Acar. Rotterdam, A.A. Balkema, 1992, p.213-217, 7 refs.
LaPlante, C.M., Bronson, D.
Waste disposal, Frozen ground strength, Freeze thaw tests, Frozen ground thermodynamics, Clay soils, Permeability, Cold weather performance, Linings.

46-3997
Effects of temperature cycle on embrittlement of geomembrane.
Budiman, J., et al. Environmental geotechnology. Edited by M.A. Usmen and Y.B. Acar. Rotterdam, A.A. Balkema, 1992, p.237-241, 5 refs.
Mills, W.C.
Linings, Freeze thaw tests, Frost resistance, Strain tests, Tensile properties, Brittleness, Synthetic materials, Polymers, Geotextiles.

46-3998
Mechanical properties of sea ice and bearing strength of pack ice. (*Propriétés mécaniques de la glace de mer et capacité portante de la banquise*).
Lainey, L., Montréal, École polytechnique, Centre d'ingénierie nordique, 1982, 282p., CINEP 665-237, Ph.D. thesis. In French with English summary. 144 refs.
Sea ice, Pack ice, Ice cover strength, Ice loads, Anisotropy, Ice elasticity, Bearing strength, Strain tests, Analysis (mathematics).

46-3999
Ice force measurements on a bridge pier in the St. Regis River, New York.
Haynes, F.D., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Oct. 1991, SR 91-14, 6p., ADA-249 504, 10 refs.
River ice, Measuring instruments, Ice floes, Piers, Design criteria, Ice solid interface.
An ice force panel was installed on the upstream nose of a pier of the new (1989) bridge over the St. Regis River at Hogansburg, NY. This panel is a simply supported beam, pinned at the bottom, and has a load cell for the reaction at the top. Ice forces measured with this panel during the Mar. 16, 1990 ice run are presented. Ice failed against the panel by impact, by crushing and possibly by splitting of the floes.

46-4000
Vector analysis of ice fabric data.
Ferrick, M.G., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Mar. 1992, CR 92-01, 17p., ADA-250 832, 20 refs.
Claffey, K.J.
Sea ice, Analysis (mathematics), Ice mechanics, Ice crystals, Orientation.
The mechanical properties of ice are strongly affected by crystal texture and c-axis alignment. In this report a general quantitative method for analysis of uniaxial crystal orientation data was developed. These data are represented as unit vectors from the origin with endpoints on the surface of a unit sphere. An orthogonal least-squares error measure is used to develop equations that define the closest plane and line through the data. The resulting eigenvalue problem is identical to that obtained by other investigators using different methods. However, an implicit assumption in the method was identified, and it was observed that the error measure represents physical distance and quantifies the goodness-of-fit of the idealized structures to the data. For comparison, a parallel development is presented of classical dependent-variable least squares. A method is developed to transform the data and the results for viewing on Schmidt nets drawn in the best plane and the predominant basal plane of a sample, in addition to the standard xy-plane. Applications of the analysis to sea ice samples include both numerical and Schmidt net presentations of results.

46-4001
European foundation designs for seasonally frozen ground.
Farouki, O.T., *U.S. Army Cold Regions Research and Engineering Laboratory. Monograph*, Mar. 1992, M 92-01, 113p., ADA-250 833, 51 refs.
Frost heave, Foundations, Design, Frozen ground mechanics, Cold weather construction.
The report deals with the design of foundations against frost action in Europe, particularly as practiced in the Nordic countries. It describes how insulation is used in association with foundations of structures as part of a process of thermal engineering to produce safe and economic designs for various structures. The use of insulation enables heat management that allows shallower foundation depths and prevents damage from frost action. Results are given from the Norwegian Frost I Jord research project and the work at Lund University, Sweden, both of which provided the basis for the design guidelines of Norway, Sweden and Finland. Detailed slab-on-grade designs ensure that frost heave does not occur. Consideration is given to the design of foundations with a crawl space or basement, with their problems of sidegrip and horizontal frost pressure. Frost protection for unheated buildings is described, usually involving the use of insulation and drainage layers below the foundation with ground insulation nearby to retain soil heat. Designs with open foundations are described, as well as foundations for retaining walls and bridges. Frost protection required during winter construction is detailed.

46-4002
Ice thickness observations; North American arctic and subarctic, 1972-73 and 1973-74.
Bilello, M.A., et al. *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Dec. 1991, SR 43-8, 127p., ADA-250 830, 4 refs.
Bates, R.E.
Lake ice, River ice, Ice conditions, Sea ice, Ice cover thickness, Ice breakup, Freezeup, Ice formation, Ice reporting.
This eighth in a series of reports on lake and river ice and landfast sea ice presents ice thickness measurements observed throughout the North American arctic and subarctic during the 1972-73 and 1973-74 winter seasons. Information on surface ice conditions, dates of first ice, freeze-over and breakup, and detailed measurements of ice thickness across Alaskan rivers are also included. Some reports from the Alaska National Guard network on ice thickness measurements in remote areas of western Alaska are also presented. Analyses were made of maximum observed ice thicknesses reported during the two winters, and isoline maps that show the areal distribution of these values across Canada and Alaska were drawn.

46-4003
Air tightness measurement technique for multiplex housing.
Flanders, S.N., *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Mar. 1992, CR 92-02, 11p., ADA-250 831, 5 refs.
Air flow, Buildings, Houses, Measurement.
This report develops means to evaluate the air tightness of multiple-residence buildings using fan pressurization apparatuses. The fan pressurization apparatuses are mounted in the doors of adjacent attached dwellings, either to equalize pressures between dwellings or to coordinate a pressure difference. Equalization of pressures between adjacent zones permits evaluation of the exterior envelope tightness. Coordination of pressures between adjacent zones permits evaluation of the tightness of party walls or floors. The report discusses the sampling requirements necessary to achieve adequate precision for calculating an equivalent leakage area, L, from each mode of pressurization. Several field studies of multiple-residence buildings at Fort Drum, NY, provided an opportunity to test the principles described in this paper. The buildings measured often had very consistent values of L per unit of envelope area or party wall or roof area within a neighborhood constructed by the same contractor. Confidence limits obtained for calculating L gave a 95% chance of being within bounds determined by the following factors: 1) zone difference measurements had an upper limit of 1.1 or a lower limit of 1/1.1, and 2) pressure difference measurements across a party wall or floor had an upper limit of 1.4 to 5.5 or a lower limit of 1/1.4 or 1/5.5.

46-4004
Space-charge-limited currents in ice.
Petrenko, V.F., et al. *Soviet physics JETP*, Aug. 1984, 60(2), p.320-326, 16 refs. Translated from Zhurnal eksperimental'noĭ i teoreticheskoĭ fiziki.
Ryzhkin, I.A.
Ice physics, Ice models, Ice electrical properties, Ions, Protons, Analysis (mathematics).

46-4005
Electric polarization of ice at nonuniform elastic strains.
Evtushenko, A.A., et al. *Physica status solidi (a)*, 1984, Vol.86, p.K31-K34, 5 refs.
Petrenko, V.F., Ryzhkin, I.A.
Polarization (charge separation), Ice electrical properties, Dielectric properties, Ice physics, Analysis (mathematics).

46-4006
Thoughts on gliding slab avalanches.
Bahnson, R., *Avalanche review*, Apr. 1992, 10(6), p.4-5.
Avalanches, Avalanche mechanics, Snow temperature.

46-4007
Anatomy of a snowmobile-triggered avalanche fatality.
Birkeland, K., *Avalanche review*, Apr. 1992, 10(6), p.5.
Avalanches, Avalanche triggering.

46-4008
El Niño and avalanches.
Gibson, C., *Avalanche review*, Apr. 1992, 10(6), p.6-7, ? refs.
Avalanches, Atmospheric circulation, Meteorological factors

46-4009
Glaciosedimentation cycles of the Lithuanian Pleistocene. [Gliatsiosedimentatsionnye tsikly pleistotsena Litvy].
Gaigalas, A.I., Vilnius, Mokslas, 1979, 94p., In Russian with English and Lithuanian tables of contents and summaries. Refs. p.89-94.
Pleistocene, Paleoclimatology, Glacial deposits, Moraines, Lithology, Sedimentation, Stratigraphy.

46-4010
Multi-year ice stamookhas in the Kara Sea.
Borodachev, V.E., et al, New York, Engineering Consulting & Translation Center (ECTC), n.d., 7p., ECTC No.T-900-11, 4 refs. For Russian original see 46-1799.
Komov, N.I., Dvorkin, E.N.
Hummocks, Grounded ice, Drift, Ice mechanics, Sea ice.

46-4011
On morphological characteristics of stamookhas.
Borodachev, V.E., et al, New York, Engineering Consulting & Translation Center (ECTC), n.d., 10p., ECTC No.T-900-12, 11 refs. For Russian original see 46-1800.
Hummocks, Grounded ice, Drift, Sea ice, Ice structure.

46-4012
Implications for climate and sea level of revised IPCC emissions scenarios.
Wigley, T.M.L., et al, *Nature*, May 28, 1992, 357(6376), p.293-300, 47 refs.
Raper, S.C.B.
Climatic changes, Sea level, Models.
A new set of greenhouse gas emissions scenarios has been produced by the Intergovernmental Panel on Climate Change (IPCC). Incorporating these into models that also include the effects of CO2 fertilization, feedback from stratospheric ozone depletion and the radiative effects of sulphate aerosols yields new projections for radiative forcing of climate and for changes in global-mean temperature and sea level. Changes in temperature and sea level are predicted to be less severe than those estimated previously, but are still far beyond the limits of natural variability. Brief reference is made to both polar regions. (Auth. mod.)

46-4013
Carbon isotope composition of atmospheric CO2 during the last ice age from an antarctic ice core.
Leuenberger, M., et al, *Nature*, June 11, 1992, 357(6378), p.488-490, 35 refs.
Siegenthaler, U., Langway, C.C.
Atmospheric composition, Carbon dioxide, Ice cores, Ice composition, Antarctica --Byrd Station.
Bubbles of ancient air in polar ice cores have revealed that the atmospheric concentration of CO2 during the Last Glacial Maximum was *180-200 p.p.m.v., substantially lower than the* pre-industrial value of about 280 p.p.m.v. It is generally thought that this reduction in atmospheric CO2 during glacial time was driven by oceanic processes. The most likely explanations invoke *either a decrease in dissolved CO2 in surface* waters because of a more efficient 'biological pump' transporting carbon to deep waters, or a higher alkalinity in the glacial ocean as a consequence of changes in carbonate dissolution or *sedimentation. Because isotope fractionation during photo*synthesis depletes C-13 in the organic matter produced, changes in the biological pump would alter the carbon isotope composition of atmospheric CO2, whereas changes in alkalinity *would in themselves have no such effect. Reported here are* measurements of the carbon isotope content of CO2 in ice cores from Byrd Station in an attempt to distinguish between these mechanisms. During the ice age the reduced isotope ratio *delta*C-13 was more negative than pre-industrial values by 0.3* per mill. Although this result does not allow a definite discrimination between the two possible causes of lower glacial atmospheric CO2, it does indicate that changes in the strength *of the biological pump cannot alone have been responsible.* (Auth. mod.)

46-4014
Acoustic and seismic signals from snow avalanches.
Firstov, P.P., et al, *Akademiia nauk SSSR. Doklady. Earth science sections*, Apr. 1992, 312(1-6), p.12-15, 7 refs. For Russian original see 45-321.
Sukhanov, L.A., Pergament, V.Kh., Rodionovskiĭ, M.V.
Avalanche triggering, Snow acoustics, Acoustic measurement, Sound transmission, Seismic reflection, Snow air interface, Wave propagation.

46-4015
Tritium distribution and circulation of waters in the Chukchi Sea in the winter-spring period.
Sergeev, A.F., et al, *Akademiia nauk SSSR. Doklady. Earth science sections*, Apr. 1992, 312(1-6), p.300-303, Translated from Akademiia nauk SSSR. Doklady, 1990, No.6. 5 refs.
Hydrogen, Sea ice, Sampling, Ocean currents, Hydrography, Isotope analysis, Oceanographic surveys, Seasonal variations.

46-4016
Some remarks on the Stefan problem with surface structure.
Gurtin, M.E., et al, *Quarterly of applied mathematics*, June 1992, 50(2), p.291-303, 18 refs.
Soner, H.M.
Stefan problem, Liquid solid interfaces, Phase transformations, Analysis (mathematics), Capillarity, Supercooling, Surface structure, Snow crystal growth.

46-4017
Progeny freeze testing, progeny field testing and parental phenology of *Pinus sylvestris* (L.) clones in northern Sweden.
Nilsson, J.E., et al, *Scandinavian journal of forest research*, 1991, 6(2), p.177-195, 16 refs.
Andersson, B., Walfridsson, E.A.
Forestry, Cold tolerance, Trees (plants), Cold weather tests, Acclimatization, Frost resistance, Damage, Revegetation.

46-4018
Deterioration of lightweight fly ash concrete due to gradual cryogenic frost cycles—discussion.
Sturrup, V.R., et al, *ACI materials journal*, Mar.-Apr. 1992, 89(2), p.208, Includes reply. 1 ref. For article under discussion see 45-3828.
Khayat, K.H.
Concrete strength, Freeze thaw tests, Compressive properties, Frost action, Accuracy, Damage.

46-4019
Mixtures of ammonia and water and of methane and water at high pressures.
Boone, S.C., Los Angeles, University of California, 1989, 347p., University Microfilms order No. AAC8926460, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Feb. 1990, p.3489.
Solutions, Hydrates, High pressure ice, Clathrates, Phase transformations, High pressure tests, Chemical analysis, Low temperature research, Thermodynamics.

46-4020
Soil and groundwater contamination by petroleum in frozen soils.
Panday, S.M., Pullman, Washington State University, 1989, 268p., University Microfilms order No. AAC9025420, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Oct. 1990, p.1966.
Oil spills, Fluid flow, Tundra, Soil pollution, Water pollution, Ground water, Forecasting, Environmental impact, Frozen ground thermodynamics, Mathematical models.

46-4021
Increasing the energy efficiency of icemaking by continuous solidification and hydraulic harvesting.
Boyette, M.D., Raleigh, North Carolina State University, 1990, 163p., University Microfilms order No. AAC9121962, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1991, p.1570.
Ice makers, Hydraulics, Refrigeration, Solidification, Ice solid interface, Performance, Water pressure, Mechanical tests, Agriculture, Temperature effects.

46-4022
Buoyant jet flows and mixing in stratified lakes, reservoirs or ponds.
Gu, R., Duluth, University of Minnesota, 1991, 289p., University Microfilms order No.AAC9130156, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Nov. 1991, p.2683.
Hydraulic jets, Buoyancy, Reservoirs, Ice cover effect, Water temperature, Stratification, Ice water interface, Temperature gradients, Mathematical models, Lake ice.

46-4023
Discrete element modeling of granular flows.
Babić, M., Potsdam, Clarkson University, 1990, 180p., University Microfilms order No.AAC9102986, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Feb. 1991, p.3970.
Rheology, River ice, Ice water interface, Fluid dynamics, Ice jams, Mathematical models, Viscoelasticity.

46-4024
Radar polarimetric models of geophysical media.
Wen, B., Seattle, University of Washington, 1989, 206p., University Microfilms order No.AAC9007010, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Apr. 1990, p.4700
Remote sensing, Wave propagation, Scattering, Polarization (waves), Ice cover effect, Snow cover effect, Surface features, Attenuation, Analysis (mathematics).

46-4025
Textural parameters as characteristics of deposits in the modern glaciomarine sedimentary environment, Hornsund Fjord, Spitsbergen.
Filipowicz, C., Warsaw, Poland, University of Warsaw, 1989, 108p., University Microfilms order No. AAC9126134, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Oct. 1991, p.1914.
Marine geology, Marine deposits, Glacial deposits, Bottom sediment, Sediment transport, Classification, Statistical analysis, Ice rafting.

46-4026
Condensation and structure of amorphous ice and *ab initio* study of water/atomic hydrogen and water/molecular hydrogen interactions.
Zhang, Q., Chicago, University of Illinois, 1991, 201p., University Microfilms order No.AAC9132319, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Dec. 1991, p.3091.
Amorphous ice, Ice physics, Molecular structure, Condensation, Hydrogen bonds, Molecular energy levels, Thermodynamic properties, Anisotropy, Water structure.

46-4027
Spectroscopic investigation of simple, mixed, and *double clathrate hydrates: probe of defect activity.*
Fleyfel, F.A., Oklahoma City, Oklahoma State University, 1990, 201p., University Microfilms order No. AAC9119866, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1991, p.857.
Clathrates, Hydrates, Infrared spectroscopy, Molecular structure, Cryogenics, Crystal defects, Spectra, Latticed structures.

46-4028
Elastostatic Winkler supported layer contact mechanics and elastohydrodynamic plate uplift.
Zhao, Z.G., Potsdam, Clarkson University, 1991, 90p., University Microfilms order No.AAC9123926, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1991, p.1537.
Floating ice, Ice mechanics, Ice sheets, Loading, Ice elasticity, Hydrodynamics, Ice water interface, Dynamic loads, Static loads, Analysis (mathematics).

46-4029
Computer model of the Late Wisconsinan Cordilleran Ice Sheet.
Roberts, B.L., Kent, Kent State University, 1990, 297p., University Microfilms order No.AAC9113546, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, June 1991, p.5777.
Pleistocene, Glacier flow, Ice models, Glacier mass balance, Computerized simulation, Altitude, Glacier oscillation.

46-4030
Rotational Raman spectrum of hydrogen dissolved in water.
Taylor, D.G., Berkeley, University of California, 1990, 109p., University Microfilms order No.AAC9126804, Ph.D. thesis. For abstract see Dissertation abstract international, Sec. B, Oct. 1991, p.2059.
Hydrogen, Ice physics, Spectra, Molecular structure, Molecular energy levels, Liquid phases, Absorption, Simulation, Thermodynamics.

46-4031
Quaternary research in Australian Antarctica: future directions. Proceedings of a meeting held in Canberra, 6-7 Dec. 1990.
Gillieson, D., ed, Special Publication No.3, Department of Geography and Oceanography, University College, Australian Defence Force Academy, Canberra, 1991, 119p., Refs passim. For individual papers see 46-4032 through 46-4037 or E-46482 through E-46492.
Fitzsimons, S., ed.
DLC QE696.Q353
Research projects, Glacial geology, Quaternary deposits, Geochronology, Antarctica.
This is a collection of papers presented at a symposium held in Canberra on Dec. 6-7, 1990, to review the status of Quaternary research in the Australian Antarctic Territory. In addition to 11 full-length papers, the volume contains a list of participants

and 12 recommendations of the meeting. These recommendations outline needs that will have to be met for continued success in Quaternary research in Antarctica.

46-4032

Field evidence on Cainozoic history and landforms in the northern Prince Charles Mountains, East Antarctica.

Adamson, D., et al, Quaternary research in Australian Antarctica: future directions, edited by D. Gillieson and S. Fitzsimons. Special Publication No.3, Department of Geography and Oceanography, University College, Australian Defence Force Academy, Canberra, 1991, p.5-14, 6 refs.

Darragh, A.

DLC QE696.Q353

Glacial geology, Limnology, Quaternary deposits, Landforms, Mountain glaciers, Antarctica—Prince Charles Mountains, Antarctica—Beaver Lake, Antarctica—Radok Lake.

Field observations of glacial deposits, fossil marine mollusca, palaeo-topography, lake bathymetry, and present glacial and non-glacial landforms were carried out in 1988-89 in the northern Prince Charles Mountains flanking the western side of the Lambert Glacier and Amery Ice Shelf. The area studied was *from Dovers Base to Else Platform and south to Nilsson Rocks*, focussing on the Beaver Lake-Radok Lake region and nearby massifs. The distribution of till and marine fossils, the underwater vee-shape and great depth (to at least 230 m below present sea level) of Pagodroma Gorge across the floor of Beaver Lake, and non-glacial landforms are consistent with the Beaver Lake area (Amery Oasis), being unaffected by erosive fast flowing ice of major outlet glaciers since at least late Tertiary time. A palaeo land surface that predates probable late Tertiary fossiliferous till has been identified. Local mountain glaciers are now contained within their lateral and terminal moraines. Large *regional glaciers, tributary to the Lambert Glacier and Amery* Ice Shelf, are now recessive with ice surfaces from a few to over 100 m below most recent lateral moraines. The observations are consistent with minimum rather than maximum models of the antarctic ice sheet during Quaternary glacial periods. (Auth. mod.)

46-4033

Glacial history of the Lambert Glacier, Prince Charles Mountains area, and comparisons with the record from the Transantarctic Mountains.

Mabin, M.C.G., Quaternary research in Australian Antarctica: future directions, edited by D. Gillieson and S. Fitzsimons. Special Publication No.3, Department of Geography and Oceanography, University College, Australian Defence Force Academy, Canberra, 1991, p.15-23, 21 refs.

DLC QE696.Q353

Glacier surfaces, Glacier oscillation, Mountain glaciers, Ice sheets, Glacial geology, Antarctica—Lambert Glacier, Antarctica—Prince Charles Mountains, Antarctica—Transantarctic Mountains.

Evidence of phase response of ice sheet and local alpine glaciers has been demonstrated from the Transantarctic Mountains. In this area, large East Antarctic Ice Sheet *outlet glaciers drain through* the Transantarctic Mountains to feed into the Ross Ice Shelf. Evidence exists that during the Last Glaciation the ice sheet expanded by only 30-100 m while its outlet glaciers thickened by 800-1000 m in their lower reaches in response to widespread grounding of the Ross Ice Shelf. No similar pattern has been observed in the Northern Prince Charles Mountains-Amery Ice Shelf area. On Fisher Massif lateral moraines indicate an ice surface increase of less than 100 m in the region of the present Lambert Glacier grounding line. Further down glacier around Beaver Lake there is no evidence for an increase in surface *elevation of either the Lambert Glacier or the large outlet glaciers*. This suggests that during the Last Glaciation the Amery Ice Shelf did not become grounded, and the Lambert Glacier system was responding differently from the outlet glaciers that drain into the Ross Embayment area. (Auth. mod.)

46-4034

Geomorphic development of the Vestfold Hills: questions regarding Holocene deglaciation.

Fitzsimons, S.J., Quaternary research in Australian Antarctica: future directions, edited by D. Gillieson and S. Fitzsimons. Special Publication No.3, Department of Geography and Oceanography, University College, Australian Defence Force Academy, Canberra, 1991, p.25-35, 9 refs.

DLC QE696.Q353

Paleoclimatology, Quaternary deposits, Landforms, Ice sheets, Glaciers, Age determination, Antarctica—Vestfold Hills.

Four mechanisms of moraine development in the Vestfold Hills, inferred from analysis of the ridges and ice marginal depositional processes, are small push moraines, larger moraines that form by erosion and redeposition of large blocks of fjord-bottom sediment, ice-contact screes and fans, and moraines that form along the axial areas of major englacial folds. The principal trend of the major moraines of the hills together with an analysis of their sedimentary structures and C-14 dates from marine shells suggest that most of the ridges have been formed by northwesterly flowing ice that excavated *glaciomarine sediment* from fjords. Taken together, the mapping of glacial depositional landforms and observations of ice marginal depositional processes suggest that the Vestfold Hills may have been glaciated by a marginal expansion of the Sörsdal Glacier. C-14 dates from ice marginal landforms suggest that the deglaciation of the Vestfold Hills consisted of a rapid early Holocene retreat of the margin of the Sorsdal Glacier south of its present position, followed by a readvance. The questions raised by this work are moving toward a re-examination of the pattern and timing of the Holocene deglaciation of the Vestfold Hills; it is suggested that the most productive way to proceed is through a study on the raised beaches and isostatic history of the area. (Auth. mod.)

46-4035

Examples of ice damming of lakes in the Vestfold Hills, East Antarctica, with implications for landscape development.

Gore, D.B., Quaternary research in Australian Antarctica: future directions, edited by D. Gillieson and S. Fitzsimons. Special Publication No.3, Department of Geography and Oceanography, University College, Australian Defence Force Academy, Canberra, 1991, p.37-44, 5 refs.

DLC QE696.Q353

Ice dams, Lake ice, Glacial deposits, Floods, Antarctica—Vestfold Hills.

A large, abandoned channel in the Vestfold Hills is largely attributed to repeated failure of an ice dam. Peak discharge of one flood was estimated at 57 cu m/s, and the total flood volume was estimated at 820,000 cu m. Reconstructed impoundment volume is comparable to the volume of water released during the 1987 failure of a nearby ice dam. Near Boulder Hill *in* the southeast, and possibly also in the west of the Hills, these floods have been important mechanisms for reworking and concentrating glacial debris, creating large alluvial fans. (Auth.)

46-4036

Raised beaches of the Bunger Hills, Antarctica.

Colhoun, E.A., et al, Quaternary research in Australian Antarctica: future directions, edited by D. Gillieson and S. Fitzsimons. Special Publication No.3, Department of Geography and Oceanography, University College, Australian Defence Force Academy, Canberra, 1991, p.79-84, 9 refs.

Adamson, D.A.

DLC QE696.Q353

Ice cover thickness, Geomorphology, Glacial geology, Antarctica—Bunger Hills.

Raised beaches are widely distributed in the Bunger Hills and are of middle to late Holocene age. They usually occur up to 8.5 m (maximum 10 m) above HWM and have been uplifted at 1.6 m/ka during the last 6000 yrs. The oasis was approximately its present size by 5600 yrs B.P. and the Antarctic Ice Sheet edge has remained almost stable since. Total Holocene uplift is estimated at 47 m. Early Holocene beaches remain below present sea level. Last glaciation ice cover was thin. It is estimated to have been more than 150 m but probably not over 300 m. (Auth.)

46-4037

Raised beaches, Late Quaternary sea-levels and deglacial sequences on the Victoria Land coast, Ross Sea, Antarctica.

Kirk, R.M., Quaternary research in Australian Antarctica: future directions, edited by D. Gillieson and S. Fitzsimons. Special Publication No.3, Department of Geography and Oceanography, University College, Australian Defence Force Academy, Canberra, 1991, p.85-105, 15 refs.

DLC QE696.Q353

Geomorphology, Sea level, Ice cover thickness, Glacial geology, Antarctica—Victoria Land, Antarctica—Ross Sea.

The paper describes the character and distribution of raised coastal features ranging from +2 m to +32 m altitude along the Victoria Land coast and on islands of the Ross Sea. The distribution of features is discussed with respect to ice-sheet reconstructions and to sea-level change models. Problems inherent to this line of investigation include dating of the marine limit, and distinct spatial grouping of the coastal land form types. These problems notwithstanding, distinctive patterns of ridge heights and sequences occur that are similar to those expected from sea-level change models. It is concluded that Ross Sea ice volumes at 18,000 yr B.P. have been over-estimated in geophysical modelling of global Holocene relative sea-level changes, and that ice thicknesses on the central Victoria Land coast have been over-estimated in ice mass reconstructions. Acceptance of a smaller ice mass and local thickness necessitates re-interpretation of the deglacial sequence in the Ross Sea embayment and considerably increases the pertinence of the raised beach record to this exercise. (Auth. mod.)

46-4038

Characterization of individual fine-fraction particles from the arctic aerosol at Spitsbergen, May-June 1987.

Anderson, J.R., et al, *Atmospheric environment*, June 1992, 26A(9), p.1747-1762, 38 refs.

Buseck, P.R., Saucy, D.A., Pacyna, J.M.

Atmospheric composition, Air pollution, Aerosols, Sampling, Marine atmospheres, Chemical composition, X ray analysis, Particles.

46-4039

Modeling the effect of winter climate on high-elevation red spruce shoot water contents.

Boyce, R.L., et al, *Forest science*, Dec. 1991, 37(6), p.1567-1580, 41 refs.

Friedland, A.J., Webb, E.T., Herrick, G.T.

Forestry, Cold tolerance, Trees (plants), Desiccation, Transpiration, Water balance, Temperature effects, Meteorological factors, Simulation.

46-4040

Prospects for using nuclear reactors on arctic transport ships.

Dolgov, V.N., *Soviet atomic energy*, Feb. 1992, 71(2), p.611-614, Translated from Atomnaia energiia, 6 refs.

Marine transportation, Submarines, Nuclear power, Engines, Design, Subglacial navigation, Standards, Performance, Icebreakers.

46-4041

Radioactive contamination of the Arctic Ocean, based on observations in 1985-1987.

Nikitin, A.I., et al, *Soviet atomic energy*, Feb. 1992, 71(2), p.687-690, Translated from Atomnaia energiia, 9 refs.

Sea water, Fallout, Water pollution, Radioactive isotopes, Sampling, Radioactive wastes, Periodic variations, Chemical composition.

46-4042

Ice-ocean coupled model for the Northern Hemisphere.

Cheng, A., et al, *Geophysical research letters*, May 4, 1992, 19(9), p.901-904, 13 refs.

Preller, R.H.

Ice forecasting, Ice models, Sea ice distribution, Atmospheric circulation, Air ice water interaction, Drift, Mathematical models, Wind factors.

46-4043

Assessing the sensitivity of Canada's ecosystems to climatic change.

Rizzo, B., et al, *Climatic change*, May 1992, 21(1), p.37-55, 38 refs.

Wiken, E.

Ecosystems, Climatic changes, Global warming, Environmental impact, Classifications, Carbon dioxide, Landscape types, Simulation, Seasonal variations.

46-4044

Sound of ice break-up and floe interaction.

Xie, Y., et al *Acoustical Society of America. Journal*, Mar. 1992, 91(3), p.1423-1428, 14 refs.

Farmer, D.M.

Sea ice, Ice breakup, Ice acoustics, Underwater acoustics, Ice friction, Wave propagation, Subglacial observations, Mathematical models, Cracking (fracturing).

46-4045

Very low frequency ambient noise at the seafloor under the Beaufort Sea icecap.

Webb, S.C., et al, *Acoustical Society of America. Journal*, Mar. 1992, 91(3), p.1429-1439, 35 refs.

Schultz, A.

Sea ice, Acoustic measurement, Underwater acoustics, Ice cover effect, Sound transmission, Very low frequencies, Wave propagation, Spectra, Subglacial observations, Seismic reflection.

46-4046

Calculating the regimes and rate of growth of hail. [Raschet rezhimov i skorosti rosta grada].

Bekriaev, V.I., et al, *Leningrad [Sankt-Peterburg]. Glavnaia geofizicheskaia observatoriia. Trudy*, 1991, Vol.538, p.42-56, In Russian. 7 refs.

Gurovich, M.V.

Hailstone growth, Hailstones, Hail clouds, Analysis (mathematics), Models.

46-4047

Remote radiometric determination of characteristics of artificially compacted snow covers in Antarctica [Distantsionnoe radiometricheskoe opredelenie kharakteristik iskusstvenno uplotnennykh snezhnykh pokrytii v usloviiakh Antarktidy].

Tarabukin, I.A., et al, *Leningrad [Sankt-Peterburg]. Glavnaia geofizicheskaia observatoriia. Trudy*, 1991, Vol.538, p.57-70, In Russian. 7 refs.

Galkin, S.I.

Remote sensing, Radiometry, Snow compaction, Snow density, Snow physics, Microwaves, Infrared radiation, Aircraft landing areas, Runways, Analysis (mathematics), Electromagnetic properties, Radiation measuring instruments, Visibility, Antarctica—Molodezhnaya Station.

Investigations were conducted in an area of snow airfields for heavy-wheeled airplanes at Molodezhnaya Station and included radiometric and glaciological studies. The interrelationships of the characteristics of *thermal microwave emissions of*

artificially compacted snow with its physical characteristics were studied. Results showed that it is possible to monitor the density characteristics of runways of snow airfields using an existing radiometric device. The radiometer can be used for orientation during movement under conditions of poor visibility.

46-4048

Radiophysical investigations of the characteristics of cloudy atmosphere in Antarctica. [Radiofizicheskoe issledovanie kharakteristik oblachnoi atmosfery v usloviiakh Antarktidy].

Bannikov, V.I., et al. *Leningrad [Sankt-Peterburg]. Glavnaia geofizicheskaia observatoriia. Trudy*, 1991, Vol.538, p.71-75, In Russian. 3 refs.

Galkin, S.I., Tarabukin, I.A.

Cloud droplets, Convection, Aircraft icing, Remote sensing, Water content, Cold weather operation, Antarctica—Molodezhnaya Station.

Results from combined passive-active remote sensing observations of convective cloudiness in the area of Molodezhnaya Station are presented. The presence of droplets in clouds at low temperatures, with the water content being greater than 0.05 g/cu cm, can cause aircraft icing.

46-4049

Variations in the attenuation and radar reflection coefficients of millimeter and submillimeter waves due to the temperature of cloud droplets. [Izmenenie koeffitsientov oslableniia i radiolokatsionnogo otrazheniia millimetrovykh i submillimetrovykh voln ot temperatury kapel' oblaka].

Alvazian, G.M., *Leningrad [Sankt-Peterburg]. Glavnaia geofizicheskaia observatoriia. Trudy*, 1991, Vol.538, p.91-96, In Russian. 7 refs.

Atmospheric attenuation, Radar echoes, Cloud droplets, Cloud physics, Radio waves.

46-4050

Precision analysis and recommended test procedures for mobility measurements made with an instrumented vehicle.

Shoop, S.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Apr. 1992, SR 92-07, 47p., ADA-252 014, 10 refs.

Statistical analysis, Accuracy, Measuring instruments, Vehicles, Cold weather operation.

This report addresses the precision of mobility measurements made using an instrumented vehicle. Systematic errors were documented and new techniques established to eliminate or minimize these errors. An increase in the precision and accuracy of mobility measurements will allow the successful pursuit of new research efforts of concern to cold regions mobility, such as the resistance measurements of trailing tires and terrain resistance on shallow snow or winter soils. Systematic errors due to calibration methods, temperature, vehicle speed and weight distribution were observed and quantified. Based on these results, suggested techniques to eliminate or minimize these errors and improve precision are as follows. 1) The method of calibration (air, static or rolling) should be chosen based on the objective of the experiment. Calibrating the vehicle while it is rolling yields the most consistent results from test to test; however, static calibration is needed to measure the total resistance of the vehicle running gear. 2) Because of the wide range of temperatures considered in cold regions testing and the temperature sensitivity of the equipment, the vehicle and all equipment should be operating and temperatures stabilized before vehicle calibration and testing begins. If the weather changes significantly during the course of the tests, it should be noted and the vehicle should be recalibrated. 3) The vehicle must be on as level and smooth a surface as possible because the load on the wheels is extremely sensitive to weight distribution (and tilt) of the vehicle. Small variations in the weight distribution are also reflected in the contact area of the tires. 4) Mobility testing procedures should routinely include a hard surface motion resistance measurement for each set of test conditions to serve as a reference for the terrain mobility measurements and as a comparison between data sets.

46-4051

Ship icing instrumentation.

Walsh, M.R., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Apr. 1992, SR 92-06, 40p., ADA-251 346, 3 refs.

Morse, J.S., Knuth, K.V., Lambert, D.J.

Ship icing, Ice accretion, Spray freezing, Sea spray, Design, Ice models, Measuring instruments.

To gather empirical data on ship superstructure icing upon which to base and verify a computer model that can be used to predict icing events, the U.S. Army Cold Regions Research and Engineering Laboratory was asked by the U.S. Navy David Taylor Ship Research and Development Center to create a prototype system capable of collecting relevant spray and icing data on ship decks during cold-weather cruises. The resulting ship icing instrumentation can be divided into two parts: a video system to obtain a visual record of spray and icing, and several stand-alone instrumented units to obtain quantitative data. The units are capable of measuring liquid water content of spray fluxes in either the horizontal or vertical directions, measuring ice accretion in either direction, and monitoring several other parameters such as temperature and power level. Problems associated with salt water rendered most of the spray data collected during a cruise aboard the USCGC *Midgett* unusable. Some problems with surface roughness may have degraded the ice thickness data. Otherwise, the equipment worked quite well. Further work on using a capacitance gauge to measure salt water levels needs to be conducted before the equipment is redeployed at sea.

46-4052

0.45- to 1.1-micron spectra of Prudhoe crude oil and of beach materials in Prince William Sound, Alaska.

Taylor, S., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Apr. 1992, SR 92-05, 14p., ADA-251 911, 14 refs.

Spectra, Oil spills, Environmental impact, Environmental tests, Pollution.

The spectral response in the visible and near-infrared (wavelengths of 0.45 to 1.10 micron) of different amounts of Prudhoe crude oil on water was measured. Spectral reflectance measurements were made of selected beaches and beach materials in Prince William Sound to provide ground truth data for the MEIS II imagery collected during the *Exxon Valdez* spill. A spectral mixing model was used to predict how different amounts of oil would change the spectra of beach materials in Prince William Sound.

46-4053

Evaluation of a pneumatic guy-line deicing boot.

Govoni, J.W., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1992, SR 92-04, 7p., ADA-252 013, 2 refs.

Franklin, C.H.

Icing, Ice loads, Ice prevention, Ice removal.

During the two winter field seasons of 1986-88, a 3 m-long pneumatic cable deicing boot was tested and evaluated by CRREL at the summit of Mt. Washington, NH. Favorable results from this pilot study led to the development of a longer (14 m) pneumatic boot. This longer boot, which was used to entirely encase one of the guy lines supporting a 9 m-high tower, was evaluated at the summit of Mt. Washington during the 1987-88 icing season. The performance of both pneumatic cable deicing boots during a variety of icing conditions indicates that this simple, cost-effective method of ice prevention on guy wires may be suitable for practical application.

46-4054

Model for vertical frazil distribution.

Liou, C.P., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Apr. 1992, CR 92-04, 14p., ADA-251 519, 30 refs.

Ferrick, M.G.

Frazil ice, Turbulent flow, Mathematical models, River ice.

A model is presented for the evolution of frazil over depth and with time in a turbulent flow. The net upward migration due to buoyancy of the frazil is opposed by intermittent mixing induced by large energy-containing eddies. A surface renewal model is used to describe the effects of large eddy mixing. Parameters that represent an entire water body are obtained by averaging those of discrete water columns using a probability density function. These parameters include the concentration profile, the surface age, and the surface layer thickness. A dimensionless surface renewal frequency characterizes the frazil distribution at equilibrium. The rate of heat loss from the water surface, the surface renewal frequency, and the critical surface layer thickness determine whether the frazil will evolve toward a well-mixed equilibrium state or a layered state. The model provides a physical basis for understanding the transition between these states, consistent with existing empirical criteria and field data.

46-4055

Processes of turf exfoliation (Rasenabschälung) in the high Venezuelan Andes.

Pérez, F.L., *Zeitschrift für Geomorphologie*, Mar. 1992, 36(1), p.81-106, With German and French summaries. Refs. p.104-106.

Periglacial processes, Soil erosion, Geocryology, Ice needles, Mountain soils, Vegetation patterns, Frost heave, Terraces, Geomorphology.

46-4056

Latent- and sensible-heat polynya model for the North Water, northern Baffin Bay.

Mysak, L.A., et al, *Journal of physical oceanography*, June 1992, 22(6), p.596-608, 23 refs.

Huang, F.T.

Polynyas, Sea ice distribution, Air ice water interaction, Ocean currents, Ice edge, Wind factors, Latent heat, Upwelling, Mathematical models.

46-4057

Modeling pack ice as a cavitating fluid.

Flato, G.M., et al, *Journal of physical oceanography*, June 1992, 22(6), p.626-651, 23 refs.

Hibler, W.D., III.

Ice models, Pack ice, Sea ice distribution, Fluid dynamics, Cavitation, Ocean currents, Air ice water interaction, Mathematical models, Thermodynamics, Rheology.

46-4058

"Acidic episodes" in surface waters in Europe.

Davies, T.D., et al, *Journal of hydrology*, Mar. 1992, 132(1-4), p.25-69, Refs. p.63-69.

Tranter, M., Wigington, P.G., Jr., Eshleman, K.N.

Surface waters, Snow impurities, Chemical properties, Air pollution, Snowmelt, Precipitation (meteorology), Hydrology, Chemical analysis, Ion diffusion.

46-4059

Groundwater response to snowmelt in a mountainous watershed.

Flerchinger, G.N., et al, *Journal of hydrology*, May 1992, 133(3-4), p.293-311, 14 refs.

Cooley, K.R., Ralston, D.R.

Watersheds, Snowmelt, Hydrogeology, Ground water, Seepage, Runoff, Water level, Stream flow, Simulation.

46-4060

Comparison of lake-effect snow precipitation rates determined from radar and aircraft measurements.

Braham, R.R., Jr., et al, *Journal of applied meteorology*, Mar. 1992, 31(3), p.237-246, 40 refs.

Kristovich, D.A.R., Dungey, M.J.

Precipitation (meteorology), Snowfall, Lake effects, Particle size distribution, Aerial surveys, Radar echoes, Snowflakes, Correlation, Spectra, Weather forecasting.

46-4061

Air temperature and radiation depressions associated with a snow cover.

Baker, D.G., et al, *Journal of applied meteorology*, Mar. 1992, 31(3), p.247-254, 24 refs.

Ruschy, D.L., Skaggs, R.H., Wall, D.B.

Snow cover effect, Air temperature, Temperature variations, Solar radiation, Radiation balance, Surface temperature, Climatology, Albedo, Periodic variations.

46-4062

Mechanism of increase in freeze resistance of synthetic latices under the influence of modifying nonelectrolyte additives.

Kiseleva, O.G., et al, *Colloid journal of the USSR*, Mar. 1992, 53(5), p.716-718, Translated from Kolloidnii zhurnal. 5 refs.

Korystina, L.A., Egorova, S.E., Neiman, R.E.

Solutions, Colloids, Antifreezes, Admixtures, Freezing points, Stability, Temperature effects, Adsorption.

46-4063

Modelling the leaching of radionuclides from soil by rainwater and meltwater.

Borzilov, V.A., et al, *Water resources*, Mar. 1992, 18(3), p.274-278, Translated from Vodnye resursy. 4 refs.

Vozzhennikov, O.I., Dragoliubova, I.V., Novitskii, M.A.

Watersheds, Fallout, Radioactive isotopes, Leaching, Runoff, Snowmelt, Hydrogeochemistry, Precipitation (meteorology), Forecasting.

46-4064

Radar reflectivity in snowfall.

Matrosov, S.Y., *IEEE transactions on geoscience and remote sensing*, May 1992, 30(3), p.454-461, 22 refs.

Precipitation (meteorology), Radar echoes, Snowflakes, Falling snow, Backscattering, Reflectivity, Snow optics, Snow density, Analysis (mathematics).

46-4065

Sea ice classification using SAR backscatter statistics.

Nystuen, J.A., et al, *IEEE transactions on geoscience and remote sensing*, May 1992, 30(3), p.502-509, 15 refs.

Garcia, F.W., Jr.

Sea ice, Ice conditions, Statistical analysis, Classifications, Airborne radar, Synthetic aperture radar, Backscattering, Image processing, Radar photography, Resolution, Ice navigation.

46-4066

Methods for digital analysis of AVHRR sea ice images.

Burns, B.A., et al, *IEEE transactions on geoscience and remote sensing*, May 1992, 30(3), p.589-602, 35 refs.

Schmidt-Gröttrup, M., Viehoff, T.

Sea ice, Ice conditions, Spaceborne photography, Radiometry, Image processing, Resolution, Polynyas, Ice navigation, Cloud cover.

46-4067

Effect of wind on FM-CW radar backscatter from a wet snowcover.

Koh, G., *IEEE transactions on geoscience and remote sensing*, May 1992, 30(3), MP 3085, p.619-621, 9 refs.

Snow cover, Radar echoes, Backscattering, Snow water content, Wet snow, Snow evaporation, Wind factors, Microwaves, Snow air interface.

The most important factor affecting the microwave properties of a snowcover is the liquid water content (snow wetness). An FM-CW (26.5-40 GHz) radar has been used to investigate the influence of snow wetness on the magnitude of radar backscatter from a snowcover. The radar backscatter measurements from a wet snowcover on a windy day suggest that evaporative cooling due to the wind may reduce the amount of liquid water at the snowcover surface.

46-4068
Reflectance of snow as *measured in situ* and from space in sub-arctic areas in Canada and Alaska.
Hall, D.K., et al, *IEEE transactions on geoscience and remote sensing*, May 1992, 30(3), p.634-637, 31 refs.
Foster, J.L., Chang, A.T.C.
Snow cover structure, Reflectivity, Radiometry, Snow optics, Surface properties, Snow melting, LANDSAT, Classifications.

46-4069
Seasonal and diurnal variations in SAR signatures of landfast sea ice.
Barber, D.G., et al, *IEEE transactions on geoscience and remote sensing*, May 1992, 30(3), p.638-642, 9 refs.
Sea ice, Fast ice, Spaceborne photography, Snow cover effect, Synthetic aperture radar, Classifications, Scattering, Image processing, Snow water content, Diurnal variations.

46-4070
Acquisition and processing of wide-aperture ground-penetrating radar data.
Fisher, E., et al, *Geophysics*, Mar. 1992, 57(3), p.495-504, 49 refs.
McMechan, G.A., Annan, A.P.
Geophysical surveys, Radar echoes, Subsurface investigations, Subsurface structures, Data processing, Stratigraphy, Seismology, Resolution.

46-4071
Limitations of thermoluminescence to date waterlain sediments from glaciated fiord environments of western Spitsbergen, Svalbard.
Forman, S.L., et al, *Quaternary science reviews*, 1992, 11(1-2), International Specialist Seminar on Thermoluminescence and Electron Spin Resonance Dating, 6th, Clermont-Ferrand, France, July 2-6, 1990. Proceedings. Pt.2--Quaternary applications. Edited by J. Faïn et al, p.61-70, 31 refs.
Ennis, G.
Marine deposits, Bottom sediment, Glacial deposits, Luminescence, Age determination, Accuracy, Geochronology, Quaternary deposits.

46-4072
Water throughflow and the physical effects of deformation on sedimentary glacier beds.
Murray, T., et al, *Journal of geophysical research*, June 10, 1992, 97(B6), p.8993-9002, 52 refs.
Dowdeswell, J.A.
Glacial hydrology, Subglacial drainage, Glacier beds, Deformation, Glacial deposits, Permeability, Water flow, Soil structure, Mechanical tests.

46-4073
Use of an atmospheric boundary-layer model for evaluating the effect of a pond on microclimate.
Ivanova, L.A., et al, *Water resources*, Mar. 1992, 18(3), p.288-293, Translated from Vodnye resursy. 7 refs.
Nadezhina, E.D.
Ponds, Microclimatology, Advection fog, Glaze, Turbulent boundary layer, Air water interactions, Mathematical models, Air temperature.

46-4074
Waste disposal in the Antarctic.
SCAR Panel of Experts on Waste Disposal, Kingston, Tasmania, 1989, 53p., 13 refs.
Bleasel, J.E., Bonner, W.N., Bolin, B., Knox, G.A.
Waste disposal, Environmental protection, Sanitary engineering, Sewage disposal, Health, Safety, Antarctica.
Responses to questionnaires on waste disposal from antarctic permanent stations and temporary camps in 1986 and 1987 are summarized. Types of waste included sewage, solid, and chemical wastes. Methods of disposal included removal from the area, open burning, burial in landfills or ice pits, or dumping at sea. It is recommended that wastes be incinerated when this can be done without danger to the environment or health, or if not safe, then removed from the Antarctic Treaty area.

46-4075
Coupling of gravity waves to surface currents and ice motion.
Perrie, W., et al, *Canadian technical report of hydrography and ocean sciences*, 1991, No.134, 69p., Microlog 92-00922, With French summary. 34 refs.
Rahman, M.
Ocean waves, Ocean currents, Drift, Ice floes, Air ice water interaction, Wind factors, Ice edge, Wave propagation, Boundary value problems, Mathematical models.

46-4076
Analyzing for climatological information in the long term temperature monitoring program sea temperature time series.
R.H. Loucks, Oceanology Limited, *Canadian technical report of hydrography and ocean sciences*, 1991, No.132, 209p., Microlog 91-06353, With French summary. 21 refs.
Petrie, B.
Oceanographic surveys, Water temperature, Marine atmospheres, Surface temperature, Seasonal variations, Statistical analysis, Long range forecasting, Climatic changes.

46-4077
Sea ice velocity fields off Labrador and eastern Newfoundland derived from satellite imagery: 1984-1987.
Peterson, I.K., *Canadian technical report of hydrography and ocean sciences*, Dec. 1990, No.129, 85p., Microlog 91-03289, With French summary. 9 refs.
Sea ice distribution, Drift, Ice surveys, Drift stations, Spaceborne photography, Ocean currents, Wind factors, Ice edge, Labrador Sea.

46-4078
Sea ice observations during LIMEX, March-April 1989.
Winsor, W.D., et al, *Canadian data report of hydrography and ocean sciences*, June 1990, No.81, 44p., Microlog 91-00367, With French summary. 10 refs.
Crocker, G.B., McKenna, R.K., Tang, C.L.
Sea ice distribution, Ice surveys, Ice cover thickness, Ice edge, Drift, Oceanographic surveys, Ice cover strength, Ice conditions, Labrador Sea.

46-4079
Ice age Earth: Late Quaternary geology and climate.
Dawson, A.G., London, Routledge, 1992, 293p., Refs. p.257-279.
Glaciation, Paleoclimatology, Global change, Ice age theory, Glacial geology, Glacier melting, Glacier oscillation, Stratigraphy, Geochronology.

46-4080
Phase transitions in ice slush with dynamic deformation of frozen soils.
Mikhaliuk, A.V., et al, *Soviet mining science*, Jan. 1992, 27(2), p.122-127, Translated from Fiziko-tekhnicheskie problemy razrabotki poleznykh iskopaemykh, 1991, No.2. 15 refs.
Pisarev, IU.A., Demchenko, L.A., Tokarchuk, A.V.
Frozen ground mechanics, Permafrost physics, Soil compaction, Dynamic loads, Slush, Liquid phases, Plastic deformation, Phase transformations, Mechanical tests.

46-4081
Fractionation of hydrogen isotopes in water during freezing (according to H-3 autoradiography).
Mironov, A.G., et al, *Soviet radiochemistry*, Jan. 1992, 33(3), p.292-294, Translated from Radiokhimiia, 1991, No.3. 6 refs.
Belomestnova, N.V.
Hydrogen, Isotopes, Decomposition, Drops (liquids), Water chemistry, Self diffusion, Freezing, Temperature effects, Hydrogen ion diffusion.

46-4082
Influence of temperature on kinetics of gelatin-catalyzed hydrolysis of p-nitrophenyl acetate in liquid and frozen solutions.
Sergeev, B.M., et al, *Kinetics and catalysis*, Mar. 1992, 32(5)Pt.1, p.953-958, Translated from Kinetika i kataliz, 1991, No.5. 15 refs.
Konstantinova, N.P., Sergeev, G.B.
Solutions, Phase transformations, Frozen liquids, Polymers, Decomposition, Molecular energy levels, Temperature effects, Chemical analysis.

46-4083
Dynamic observation of dislocation sources at grain boundaries in ice.
Liu, F., et al, *Philosophical magazine letters*, May 1992, 65(5), p.279-281, 5 refs.
Baker, I., Yao, G., Dudley, M.
Ice crystal structure, Ice physics, Stress concentration, Defects, X ray diffraction, Shear stress, Plastic deformation, Dynamic loads, Mechanical tests.

46-4084
Finite element analysis of ship/ice interaction.
Jebaraj, C., et al, *Computers & structures*, Apr. 17, 1992, 43(2), p.205-221, 27 refs.
Swamidas, A.S.J., Shih, L.Y., Munaswamy, K.
Ships, Ice navigation, Floating ice, Ice solid interface, Impact strength, Ice strength, Ice mechanics, Ice breakup, Mathematical models, Computerized simulation, Design criteria.

46-4085
Global change and the carbon balance of arctic ecosystems.
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Ecosystems, Vegetation factors, Climatic changes, Global change, Carbon dioxide, Tundra, Nutrient cycle, Soil air interface, Atmospheric composition, Climatology.

46-4086
Low-level temperature inversions of the Eurasian Arctic and comparisons with Soviet drifting station data.
Serreze, M.C., et al, *Journal of climate*, June 1992, 5(6), p.615-629, 37 refs.
Kahl, J.D., Schnell, R.C.
Marine atmospheres, Air temperature, Temperature inversions, Ice cover effect, Sounding, Air ice interface, Seasonal variations, Statistical analysis, Correlation.

46-4087
Proceedings. Vol.5, Part B.
International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992, New York, American Society of Mechanical Engineers, 1992, p.277-616, Refs. passim. For selected papers see 46-4088 through 46-4098.
Barbas, S.T., ed.
Pipelines, Permafrost beneath structures, Frost heave, Soil pressure, Soil stabilization, Permafrost preservation.

46-4088
Use of the inertial geometry pig for surveillance of arctic pipelines.
Anderson, H.A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.5, Part B. Edited by S.T. Barbas, et al., New York, American Society of Mechanical Engineers, 1992, p.307-314, 6 refs.
Adams, J.R., Fridel, T.W., Smith, J.D.
Pipelines, Settlement (structural), Frozen ground settling, Frost heave, Monitors, Permafrost beneath structures, Detection, Measuring instruments.

46-4089
Polar gas pipelines: operation and full-scale field tests.
Kharionovskii, V.V., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.5, Part B. Edited by S.T. Barbas, et al., New York, American Society of Mechanical Engineers, 1992, p.319-336, 7 refs.
Gas pipelines, Permafrost beneath structures, Cold weather construction, Wind pressure, Frost heave, Pipeline supports, Piles.

46-4090
Soil-pipeline interaction at a frost heave zone.
Selvadurai, A.P.S., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.5, Part B. Edited by S.T. Barbas, et al., New York, American Society of Mechanical Engineers, 1992, p.337-348, 32 refs.
Underground pipelines, Frost heave, Soil pressure, Frozen ground mechanics, Frozen ground thermodynamics, Pipeline freezing, Soil freezing, Mathematical models.

46-4091
Uplift behavior of a rigid pipe embedded in a creep susceptible frozen soil.
Selvadurai, A.P.S., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.5, Part B. Edited by S.T. Barbas, et al., New York, American Society of Mechanical Engineers, 1992, p.349-357, 11 refs.
Underground pipelines, Frost heave, Soil creep, Soil freezing, Frozen ground mechanics, Frozen ground thermodynamics, Mathematical models.

46-4092
Reliability based pipeline design for frost heave.
Maison, B.F., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.5, Part B. Edited by S.T. Barbas, et al., New York, American Society of Mechanical Engineers, 1992, p.359-366, 5 refs.
Rinawi, A., Row, D.G., Swanson, J.D.
Underground pipelines, Frost heave, Statistical analysis, Design criteria, Frost resistance.

46-4093
Design study of submerged sidebend response.
Workman, G.H., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.5, Part B. Edited by S.T. Barbas, et al., New York, American Society of Mechanical Engineers, 1992, p.367-373, 2 refs.
Underground pipelines, Soil pressure, Design criteria, Soil stabilization, Frost heave, Flexural strength.

46-4094
Major engineering approaches to construction of transmission pipelines in the USSR arctic regions.
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Pipelines, Cold weather construction, Permafrost beneath structures, Anchors, Pipeline supports, Pipe laying.

46-4095
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McDevitt, P.
Underground pipelines, Channel stabilization, Permafrost beneath structures, Pipe laying, Engineering geology.

46-4096
Analysis of the pipe and ditch thermal regime, Norman Wells pipeline.
Burgess, M.M., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.5, Part B. Edited by S.T. Barbas, et al., New York, American Society of Mechanical Engineers, 1992, p.575-584, 22 refs.
Underground pipelines, Permafrost preservation, Permafrost thermal properties, Permafrost beneath structures, Soil stabilization, Thermal regime, Temperature control.

46-4097
IPL/ESSO Norman Wells temperature excursion time limit.
Carlson, L., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.5, Part B. Edited by S.T. Barbas, et al., New York, American Society of Mechanical Engineers, 1992, p.585-589, 6 refs.
Mohitpour, M., Kim, S.
Pipelines, Permafrost preservation, Permafrost beneath structures, Ground thawing, Temperature control, Soil stabilization.

46-4098
Assessment of pipeline girth welds subject to high longitudinal strain.
Glover, A.G., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.5, Part B. Edited by S.T. Barbas, et al., New York, American Society of Mechanical Engineers, 1992, p.591-596, 23 refs.
Lambert, S.B., Dorling, D.V.
Pipelines, Welding, Soil pressure, Permafrost beneath structures, Mathematical models, Design criteria.

46-4099
Ice deformation very close to the ice-sheet margin in West Greenland.
Knight, P.G., *Journal of glaciology*, 1992, 38(128), p.3-8, 9 refs.
Glaciology, Glacier surfaces, Ice deformation, Ice edge, Strain tests, Glacier tongues, Glacier surveys, Accuracy, Flexural strength.

46-4100
***Temperature compensation* of electrical conductivity in glacial meltwaters.**
Smart, C.C., *Journal of glaciology*, 1992, 38(128), p.9-12, 5 refs.
Glaciology, Glacier melting, Meltwater, Electrical resistivity, Electrical measurement, Accuracy, Temperature effects, Ion density (concentration), Water chemistry.

46-4101
Numerical model to simulate snow-cover stratigraphy for operational avalanche forecasting.
Brun, E., et al, *Journal of glaciology*, 1992, 38(128), p.13-22, 20 refs.
David, P., Sudul, M., Brunot, G.
Avalanche forecasting, Metamorphism (snow), Snow stratigraphy, Snow cover stability, Snow air interface, Meteorological factors, Simulation, Grain size.

46-4102
BEPERS pilot study: an experiment with X-band synthetic aperture radar over Baltic Sea ice.
Leppäranta, M., et al, *Journal of glaciology*, 1992, 38(128), p.23-35, 26 refs.
Kuittinen, R., Askne, J.
Sea ice, Ice conditions, Classifications, Sensor mapping, Airborne radar, Synthetic aperture radar, Image processing, Surface properties, Backscattering.

46-4103
Ice-flow and mass changes of Lewis Glacier, Mount Kenya, East Africa, 1986-90: observations and modeling.
Hastenrath, S., *Journal of glaciology*, 1992, 38(128), p.36-42, 16 refs.
Glaciology, Glacier mass balance, Glacier oscillation, Glacier flow, Forecasting, Mathematical models, Glacier thickness, Periodic variations.

46-4104
Accumulation and flow rates of ice on Chhota Shigri glacier, central Himalaya, using radioactive and stable isotopes.
Nijampurkar, V.N., et al, *Journal of glaciology*, 1992, 38(128), p.43-50, 36 refs.
Rao, D.K.
Glacial hydrology, Fallout, Glaciology, Glacier flow, Ice dating, Isotope analysis, Flow rate, Glacier surveys, Climatic changes, Meltwater.

46-4105
Subglacial water flow inferred from stream measurements at South Cascade Glacier, Washington, U.S.A.
Fountain, A.G., *Journal of glaciology*, 1992, 38(128), p.51-64, 27 refs.
Glaciology, Glacial hydrology, Subglacial drainage, Glacier ablation, Snow cover effect, Flow measurement, Meltwater, Ice tunnels, Diurnal variations.

46-4106
Microcracking and the failure of polycrystalline ice under triaxial compression.
Kalifa, P., et al, *Journal of glaciology*, 1992, 38(128), p.65-76, 31 refs.
Ouillon, G., Duval, P.
Ice crystals, Strain tests, Ice strength, Stress concentration, Ice cracks, Microstructure, Rheology, Ice mechanics, Brittleness.

46-4107
Role of bed separation and friction in sliding over an undeformable bed.
Schweizer, J., et al, *Journal of glaciology*, 1992, 38(128), p.77-92, 43 refs.
Iken, A.
Glaciology, Glacier flow, Glacier beds, Basal sliding, Ice friction, Ice solid interface, Subglacial drainage, Water pressure, Mathematical models, Ice mechanics, Rock properties.

46-4108
Non-linear acoustic imaging of ice properties.
Guigné, J.Y., et al, *Journal of glaciology*, 1992, 38(128), p.93-100, 21 refs.
Crocker, G.B., Hunt, P.
Floating ice, Remote sensing, Physical properties, Acoustic measurement, Ice acoustics, Imaging, Ice structure, Bubbles, Ice cover thickness, Ice water interface.

46-4109
Mass balance of Himalayan glaciers using AAR and ELA methods.
Kulkarni, A.V., *Journal of glaciology*, 1992, 38(128), p.101-104, 12 refs.
Glaciology, Glacier mass balance, Snow line, Glacier surveys, Glacier oscillation, Altitude, Runoff forecasting, Correlation.

46-4110
Subglacial floods and the origin of low-relief ice-sheet lobes.
Shoemaker, E.M., *Journal of glaciology*, 1992, 38(128), p.105-112, 51 refs.
Glaciology, Ice sheets, Pleistocene, Glacial hydrology, Subglacial drainage, Flooding, Glacier surges, Lake bursts, Ice water interface, Shear stress, Ice mechanics.

46-4111
Interpretation of borehole-inclinometer data: a general theory applied to a new instrument.
Blake, E.W., et al, *Journal of glaciology*, 1992, 38(128), p.113-124, 33 refs.
Clarke, G.K.C.
Glaciology, Magnetometers, Glacier flow, Borehole instruments, Glacier surveys, Ice structure, Accuracy, Ice deformation, Theory, Orientation.

46-4112
On the pulling power of ice streams.
Hughes, T.J., *Journal of glaciology*, 1992, 38(128), p.125-151, 66 refs.
Glaciology, Ice sheets, Glacier flow, Ice mechanics, Basal sliding, Buoyancy, Ice solid interface, Analysis (mathematics), Ice deformation, Meltwater, Antarctica - West Antarctica.
Ice streams pull ice out of ice sheets and have pulling power equal to the longitudinal gravitational pulling force multiplied by the ice-stream velocity. These boundary conditions beneath and beyond ice streams can be quantified by a basal buoyancy factor that provides a life-cycle classification of ice streams into inception, growth, mature, declining and terminal stages, during which ice streams disintegrate the ice sheet. Surface profiles of ice streams are diagnostic of the stage in a life cycle, and hence of the vitality of the ice sheet. This analysis is applied to selected ice streams in Antarctica. (Auth. mod.)

46-4113
Short-term variations in flow velocity of Glacier Soler, Patagonia, Chile.
Naruse, R., et al, *Journal of glaciology*, 1992, 38(128), p.152-156, 20 refs.
Fukami, H., Aniya, M.
Glaciology, Glacier flow, Flow rate, Basal sliding, Subglacial drainage, Periodic variations, Water pressure, Glacial hydrology.

46-4114
Search for temporal changes in the velocity of Ice Stream B, West Antarctica.
McDonald, J., et al, *Journal of glaciology*, 1992, 38(128), p.157-161, 14 refs.
Whillans, I.M.
Ice sheets, Glaciology, Glacier flow, Radar tracking, Velocity measurement, Flow rate, Remote sensing, Periodic variations, Glacier surfaces, Antarctica - West Antarctica.
The position of the UpB camp on Ice Stream B, West Antarctica, has been measured 14 times during three field seasons. TRANSIT (doppler) satellite receivers were used. At the resolution of these measurements (2 m), no significant velocity variation was detected over time intervals ranging from 1 d to 2 years. (Auth. mod.)

46-4115
Predicted time-scales for GISP2 and GRIP boreholes at Summit, Greenland.
Schött, C., et al, *Journal of glaciology*, 1992, 38(128), p.162-168, 24 refs.
Waddington, E.D., Raymond, C.F.
Glaciology, Ice cores, Ice sheets, Glacier flow, Boreholes, Paleoclimatology, Ice dating, Drill core analysis, Glacier mass baiance.

46-4116
Surficial glaciology of Jakobshavns Isbrae, West Greenland: part 2. Ablation, accumulation and temperature.
Echelmeyer, K., et al, *Journal of glaciology*, 1992, 38(128), p.169-181, 32 refs.
Harrison, W.D., Clarke, T.S., Benson, C.
Glaciology, Glacier mass balance, Glacial hydrology, Ice sheets, Ice temperature, Subglacial drainage, Glacier ablation, Temperature distribution, Calving, Snow line.

46-4117
Application of a general sliding law to simulating flow in a glacier cross-section.
Harbor, J.M., *Journal of glaciology*, 1992, 38(128), p.182-190, 30 refs.
Glaciology, Ice solid interface, Glacier flow, Basal sliding, Flow rate, Water pressure, Shear stress, Mathematical models.

46-4118
Theoretical analysis of snow-dam decay.
Xia, Z.J., et al, *Journal of glaciology*, 1992, 38(128), p.191-199, 18 refs.
Woo, M.-K.
Snow cover stability, Snow hydrology, Snow erosion, Snowmelt, Dams, Stream flow, Runoff forecasting, Water erosion, Analysis (mathematics).

46-4119
How can low-pressure channels and deforming tills coexist subglacially.
Alley, R.B., *Journal of glaciology*, 1992, 38(128), p.200-207, 22 refs.
Glaciology, Glacial hydrology, Glacier flow, Subsurface structures, Basal sliding, Creep, Sediment transport, Analysis (mathematics), Water pressure, Deformation.

46-4120
Large calving event of Ventisquero San Rafael, southern Chile.
Harrison, S., *Journal of glaciology*, 1992, 38(128), p.208-209, 2 refs.
Glaciology, Ice sheets, Glacier flow, Calving, Ice volume, Subglacial drainage, Ice mechanics.

46-4121
Sea ice: a cast technique to examine and analyze brine pockets and channel structure.
Weissenberger, J., et al, *Limnology and oceanography*, Jan. 1992, 37(1), p.179-183, 16 refs.
Dieckmann, G., Gradinger, R., Spindler, M.
Sea ice, Sampling, Microstructure, Brines, Scanning electron microscopy, Laboratory techniques, Physical properties.
A casting technique was developed to examine the internal structure of sea ice using scanning electron microscopy. After removal of brine by centrifugation at *in situ* temperatures, water-soluble resin is deployed to penetrate drained brine channels of sea ice. The resin is subsequently polymerized under UV light at about -12 C. Freeze-drying eliminates the ice by sublimation, and the hardened casts can be mounted for microscopical analysis. Casts can be used to determine volume and extent of habitable space in different types of sea ice. The extracted brine is available for further studies of sea-ice organisms. Sea ice samples used in this analysis were collected from the Weddell Sea during an RV *Polarstern* cruise in 1989. (Auth.)

46-4122
Positive plant interactions in tundra vegetation and the importance of shelter.
Carlsson, B.A., et al, *Journal of ecology*, Dec. 1991, 79(4), p.973-983, 38 refs.
Callaghan, T.V.
Alpine tundra, Plant ecology, Vegetation patterns, Protection, Growth, Shelters, Wind factors, Temperature effects.

46-4123
Design debate over the nation's first arctic research vessel.
Schneider, D., et al, *Sea technology*, Mar. 1992, 33(3), p.53-60.
Elsner, R.
Ships, Oceanographic surveys, Cold weather performance, Design, Ice breaking, Ice navigation, Research projects, Ice solid interface, Construction, Icebreakers.

46-4124
Dynamic-probabilistic models for the formation of rainfall and snowmelt runoff.
Kuchment, L.S., et al, *Water resources*, May 1992, 18(4), p.335-343, Translated from *Vodnye resursy*, 1991, No.4, 17 refs.
Gel'fan, A.N.
Watersheds, Precipitation (meteorology), Runoff forecasting, Snowmelt, Flood forecasting, Simulation, Statistical analysis.

46-4125
Zonal patterns in elements of thermal regime of freshwater lakes in the Northern Hemisphere.
Rianzhin, S.V., *Water resources*, May 1992, 18(4), p.343-354, Translated from Vodnye resursy, 1991, No.4, 27 refs.
Lakes, Lake ice, Thermal regime, Surface temperature, Boundary layer, Ice cover effect, Classifications, Climatology, Analysis (mathematics).

46-4126
Ancient glaciation on Mars.
Kargel, J.S., et al, *Geology*, Jan. 1992, 20(1), p.3-7, 52 refs.
Strom, R.G.
Mars (planet), Glaciation, Extraterrestrial ice, Geomorphology, Geologic processes, Topographic features, Theory, Climatic factors.

46-4127
Ice growth and oceanic heat flux: models and measurements.
Omstedt, A., et al, *Journal of geophysical research*, June 15, 1992, 97(C6), p.9383-9390, 18 refs.
Wettlaufer, J.S.
Sea ice, Ice cover effect, Ice water interface, Ice growth, Ice models, Heat flux, Salinity, Ice temperature, Mathematical models, Drift, Ice cover thickness.

46-4128
Floe pair interaction event rates in the marginal ice zone.
Rottier, P.J., *Journal of geophysical research*, June 15, 1992, 97(C6), p.9391-9400, 31 refs.
Sea ice, Ice water interface, Impact, Ice floes, Water waves, Wave propagation, Hydrodynamics, Forecasting, Mathematical models, Mechanical properties.

46-4129
Toy model linking atmospheric thermal radiation and sea ice growth.
Thorndike, A.S., *Journal of geophysical research*, June 15, 1992, 97(C6), p.9401-9410, 6 refs.
Sea ice, Ice growth, Ice thermal properties, Thermal regime, Ice water interface, Surface temperature, Radiation balance, Mathematical models, Ice cover thickness, Air ice water interaction.

46-4130
Theoretical heights of buoyant convection above open leads in the winter arctic pack ice cover.
Serreze, M.C., et al, *Journal of geophysical research*, June 15, 1992, 97(C6), MP 3089, p.9411-9422, 39 refs.
Maslanik, J.A., Rehder, M.C., Schnell, R.C., Kahl, J.D., Andreas, E.L.
Atmospheric physics, Polynyas, Air flow, Convection, Air temperature, Sea ice, Ice cover effect, Boundary layer, Buoyancy, Temperature inversions.
A fetch-dependent boundary-layer model, driven by observed temperature sounding data, is used to examine theoretical heights of buoyant convection *(H)* above open leads in the wintertime pack ice of the central Arctic. Assuming wet adiabatic ascent with no entrainment or friction, *H* is estimated as the height at which the model-predicted equivalent potential temperature at saturation above a lead intersects with the same value of equivalent potential temperature at saturation derived from vertical sounding profiles. *H* increases with increasing lead width. For a 1000 m lead, the widest which can be reasonably expected for the central Arctic, the median value of *H* is approximately 1000 m, slightly below the median top of the low-level arctic temperature inversion layer. While *H* shows large variability, events of convection up to 4 km, as recently observed from lidar backscatter data, appear to be fairly rare. First, these events require an open lead of least 10,000 m. Second, while *H* tends to be largest under conditions of low surface wind speed, low surface temperature, and a weak low-level temperature inversion, this combination appears to be atypical of arctic conditions. Third, while the meteorological conditions that should favor the development of open leads tend to minimize *H*, conditions favoring large *H* are also those in which any newly developed leads will quickly ice over.

46-4131
Two-dimensional ocean model for long-term climatic simulations: stability and coupling to atmospheric and sea ice models.
Harvey, L.D.D., *Journal of geophysical research*, June 15, 1992, 97(C6), p.9435-9453, 49 refs.
Climatology, Air ice water interaction, Ocean currents, Upwelling, Heat balance, Sea ice, Ice cover effect, Mathematical models, Salinity, Periodic variations.

46-4132
Proceedings. Vol.4.
International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992, MP 3090, New York, American Society of Mechanical Engineers, 1992, 422p., Refs. passim. For selected papers see 46-4133 through 46-4185.
Ayorinde, O.A., ed, Sinha, N.K., ed, Sodhi, D.S., ed, Nixon, W.A., ed.
Ice cover strength, Ice loads, Ice deformation, Offshore structures, Permafrost preservation, Ice breaking, Ice pressure, Sea ice, Foundations, Soil strength, Soil pressure, Ice solid interface.

46-4133
Introduction to the U.S. Navy Arctic Laboratory.
Wales, C.A., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. *Proceedings*. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.1-4.
Environment simulation, Test chambers, Sea ice, Ships, Artificial ice, Laboratories, Cold chambers, Ice models.

46-4134
Quantifying sea ice drag through laboratory experiments.
Bruno, M.S., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.5-9, 8 refs.
Ice water interface, Drift, Ice floes, Sea ice, Test chambers, Ice models, Ice bottom surface, Ice friction.

46-4135
Seasonal ice cover variability in a coupled ice-ocean model for the Arctic Ocean.
Hakkinen, S., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.11-14, 14 refs.
Mellor, G.L.
Sea ice distribution, Air ice water interaction, Ocean currents, Ice cover thickness, Polar atmospheres, Wind factors.

46-4136
Characteristics of newly formed ice gouges in the Beaufort Sea, Alaska.
Ticken, E.J., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.15-19.
Tomil, L.J.
Ice scoring, Bottom topography, Ocean bottom, Bottom sediment, Sounding, Ice bottom surface, Pipelines, Beaufort Sea.

46-4137
Illustration of theoretical and empirical errors and the effect of the resolution of the raw data on the analysis of ice scour depths in the Beaufort Sea.
Marcellus, R.W., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. *Proceedings*. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.21-25, 8 refs.
Morrison, T.B., Fernandez, M.L.
Ice scoring, Bottom topography, Ocean bottom, Sounding, Ice bottom surface, Statistical analysis, Pipelines, Beaufort Sea.

46-4138
Nomographs for operating wheeled aircraft on sea-ice runways: McMurdo Station, Antarctica.
Barthelemy, J.L., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.27-33, 10 refs.
Ice runways, Ice cover strength, Airplanes, Logistics, Nomographs, Ice loads, Computer programs, Antarctica—McMurdo Station.
The Naval Civil Engineering Laboratory provides criteria to the National Science Foundation for the safe operation of aircraft on seasonal sea-ice runways in Antarctica. Historically, landing curves were developed for specified aircraft only; however, as heavier airplanes are introduced, as craft are flown later into the season, as traffic from foreign countries multiplies, and as the possibility of commercially motivated tours increases, it becomes important to develop more rigorous standards. Recently, some useful correlations for approximating landing stresses and parking deflections were developed from the computer program VISICE, a finite-element model that predicts both the elastic and linear viscoelastic responses of a loaded ice sheet. In this paper, the technique is extended to reformat the landing and parking curves as nomographs that demonstrate more clearly the relationships between ice thickness, gross aircraft weight, surface temperature and wheel configuration. (Auth.)

46-4139
Verification study of the new Canadian standard for concrete offshore structures.
Allyn, N., et al, International Conference on Ofishore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.35-49, 11 refs.
Yee, S., Adebar, P.
Offshore structures, Ice loads, Concrete strength, Building codes, Icebergs, Design criteria, Ocean waves.

46-4140
Ambient temperature effects on spray ice island construction using saline (sea) and fresh water.
Masterson, D.M., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.51-58, 11 refs.
Ice islands, Artificial islands, Spray freezing, Ice (construction material), Artificial freezing, Air temperature, Temperature effects, Offshore drilling.

46-4141
Performance of an offshore structure during an oil spill.
Altaee, A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.59-66, 14 refs.
Evgin, E.
Offshore structures, Soil strength, Oil spills, Artificial islands, Caissons, Soil pollution, Ice loads, Foundations.

46-4142
Load transfer mechanisms for foundation shear skirts beneath bottom founded arctic offshore exploration structures.
Sladen, J.A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon New York, American Society of Mechanical Engineers, 1992, p.67-74, 6 refs.
Evison, S.E., Hewitt, K.J.
Offshore structures, Ice loads, Soil strength, Foundations, Bottom sediment, Ocean bottom, Offshore drilling, Soil stabilization, Engineering geology.

46-4143
Ice force and rubble-related research studies at Isserk I-15.
Poplin, J.P., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.75-85, 11 refs.
Weaver, J.S.
Artificial islands, Ice loads, Grounded ice, Fast ice, Ice strength, Soil strength, Ice (construction material), Ice pressure.

46-4144
Scientific arctic drilling.
Johnson, G.L., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.85-87, 3 refs.
Liljestrom, G.
Offshore drilling, Bottom sediment, Drill core analysis, Ocean bottom, Bedrock, Paleoclimatology, Research projects, Ice breaking, Ice navigation.

46-4145
Investigating the structural integrity of a hydroelastically scaled model of a fixed offshore platform.
Marshall, M.A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.89-98, 5 refs.
Booton, M.
Offshore structures, Ocean waves, Vibration, Environment simulation, Impact tests, Models, Flexural strength.

46-4146
Nonaxisymmetric nonlinear consolidation under gravity structures.
Prasad, K.S.R., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.99-107, 13 refs.
Swamidas, A.S.J.
Offshore structures, Soil strength, Foundations, Settlement (structural), Analysis (mathematics).

46-4147
Thermal design in permafrost regions.
Zarling, J.P., et al, MP 3091, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.113-121, 22 refs.
Haynes, F.D., Lunardini, V.J.
Permafrost thermal properties, Permafrost preservation, Foundations, Soil air interface, Cooling systems, Heat pipes, Ducts, Permafrost beneath structures, Thermal analysis, Analysis (mathematics), Soil temperature.
The essential thermal analyses required for foundation design in permafrost regions are presented. Equations are given for calculating the ground surface temperature and the temperature variation in the soil. Foundation designs on piles and on grade are discussed and design methods presented.

46-4148
Assessment of prediction methods for the thickness of the active layer in permafrost regions.
Aziz, A., et al, MP 3092, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.131-138, 13 refs.
Lunardini, V.J.
Permafrost thermal properties, Active layer, Thaw depth, Permafrost heat transfer, Soil air interface, Soil temperature, Analysis (mathematics), Permafrost forecasting.
Four methods of predicting the thickness of the active permafrost layer when the annual surface temperature variation follows a sinusoidal pattern are discussed: (1) a generalized Stefan method which incorporates the thawing index; (2) a two-region Neumann solution in which an equivalent constant surface temperature is used to simulate the sinusoidal variation, (3) a coupled integral equations approach; and (4) a two-term perturbation solution. The predictions of the Neumann and the perturbation solutions are closest to the finite element results, being within 1%. However, the perturbation method may be more useful in predicting the temperature variations in the active layer with time.

46-4149
Laboratory tests with a 37-m thermosyphon in soil.
Haynes, F.D., et al, MP 3093, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.139-143, 14 refs.
Zarling, J.P., Gooch, G.E., Zabilansky, L.
Permafrost preservation, Foundations, Heat pipes, Permafrost beneath structures, Cooling systems, Heat transfer, Permafrost thermal properties, Conduction.
Tests were conducted in the laboratory with a 37 m-long thermosyphon buried in soil to simulate actual field conditions. The evaporator section was horizontal and the finned condenser section was vertical. The thermosyphon had a device to return part of the condensate to the far end of the evaporator. Unit conductance values were obtained for wind speeds ranging from 0 to 2.4 m/s directed at the condenser section. These conductance values were used in a finite element analysis to determine if they were adequate for foundation design in permafrost regions.

46-4150
Performance of a right-angled, evaporative thermosyphon.
Lock, G.S.H., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.145-148, 12 refs.
Fu, J.L.
Heat pipes, Heat transfer, Cooling systems, Permafrost preservation.

46-4151
Performance of an offset evaporative thermosyphon.
Lock, G.S.H., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.149-153, 9 refs.
Fu, J.L.
Heat pipes, Heat transfer, Permafrost preservation, Cooling systems.

46-4152
Effect of orientation on the cranked, tubular thermosyphon.
Lock, G.S.H., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.155-158, 8 refs.
Fu, J.L.
Heat pipes, Heat transfer, Permafrost preservation, Cooling systems.

46-4153
Laminar heat transfer in an air-filled bayonet tube.
Lock, G.S.H., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.159-163, 10 refs.
Wu, M.L.
Heat pipes, Heat transfer, Permafrost preservation, Cooling systems, Air flow.

46-4154
Dynamics of a moored structure model in ice.
Williams, F.M., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.165-172, 21 refs.
Duthinh, D., Valenchon, C.
Offshore structures, Floating structures, Ice loads, Moorings, Ice breaking, Impact tests, Environment simulation, Dynamic loads, Ice solid interface, Ice pressure.

46-4155
Floating ice beam impact against a sloped structure.
Coutermarsh, B.A., et al, MP 3094, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.173-181, 8 refs.
McGilvary, W.R., Sodhi, D.S.
Ice loads, Offshore structures, Ice floes, Bridges, Impact tests, Ice deformation, Ice friction, Ice pressure, Ice solid interface, Mathematical models.
Experiments were performed to measure the impact forces generated by free-floating ice beams striking a 45 deg sloped structure. Four beam lengths and impact velocities are used with a fixed beam width and thickness. A coupled fluid/solid finite element program was developed to model the impulse loads. The structure is modeled as a massless surface that can displace horizontally and vertically without rotation. The solid mechanics portion of the modelled ice is based on linear elastic beam theory, and includes rotary inertia and a static fluid foundation. The fluid dynamic portion assumes linear fluid inertial coupling for the fluid foundation. A fluid influence coefficient matrix is calculated and attached to the ice to account for the fluid foundation acceleration. The numerical model matches the experimental peak impact forces to within 10% to 33% for the majority of the beam lengths. The shortest beams considered appear to behave differently, and those experimental values were overpredicted by a factor of 2. Improvements in the predictions could be realized by including a mechanism for energy loss from the beam to the supporting fluid. The work also shows that structure stiffness greatly affects the impact force in ice/structure interactions.

46-4156
Comparison of sheet ice load prediction methods and experimental data for conical structures.
Chao, J.C., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.183-193, 29 refs.
Ice loads, Offshore structures, Ice cover strength, Ice pressure, Ice deformation, Ice solid interface, Ice friction, Mathematical models.

46-4157
Comparison of ridge load prediction methods and experimental data for conical structures.
Chao, J.C., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.195-203, 22 refs.
Ice loads, Offshore structures, Ice pressure, Ice solid interface, Pressure ridges, Ice deformation, Ice friction, Ice override, Mathematical models.

46-4158
Modelling of the drag force on an ice keel.
Jameel, M.I., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.205-212, 15 refs.
Rowe, R.D., Topham, D.R.
Pressure ridges, Ice bottom surface, Ice water interface, Drift, Ice friction, Boundary layer, Mathematical models.

46-4159
Theoretical approach to physical modelling of kinetic friction between ice and ship.
Liukkonen, S., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.213-222, 30 refs.
Ice loads, Icebreakers, Metal ice friction, Ships, Ice solid interface, Ice navigation, Ice breaking, Mathematical models.

46-4160
Indentation tests using urea ice and segmented indentors.
Sodhi, D.S., et al, MP 3095, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.223-230, 16 refs.
Chin, S.N.
Ice loads, Ice cover strength, Ice pressure, Ice deformation, Ice breaking, Urea, Artificial ice, Ice models, Impact tests, Strain tests.
Segmented indentors were used to conduct indentation tests using urea model ice. Each segment of an indentor was supported on three load cells to enable measurement of force generated in that segment as a result of interaction with ice. Tests were conducted using 3, 5 or 7 segments. The range of ice thickness was between 40 and 81 mm, and the rate of indentation was between 2 and 400 mm/s. The results are presented as time-history plots of forces across each segment as well as the whole width of an indentor. The main result of these tests is that the effective pressure measured during tests at a low indentation rate was higher than that at high indentation rate. The force-time plots indicate that there was simultaneous failure of ice on all segments at low indentation rates, and that there was nonsimultaneous failure of ice at high rates of indentation. This behavior is attributed to brittle, flaking failure at high indentation rates. Spectral analysis of force data indicates that most of the power is contained at frequencies of less than 5 Hz. The peaks in the ice force records fit a Weibull probability distribution.

46-4161
Nonlinear dynamic response of a simple ice-structure interaction model.
Karr, D.G., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.231-237, 15 refs.
Troesch, A.W., Wingate, W.C.
Ice loads, Ice cover strength, Ice deformation, Ice solid interface, Ice breaking, Offshore structures, Ships, Mathematical models.

46-4162
Measuring and modeling temperature distribution in Glacier No.1, Tianshan, China.
Cai, B.L., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.239-244, 13 refs.
Huang, M.H., Xie, Z.C.
Glacier surveys, Ice temperature, Glacial hydrology, Temperature distribution, Glacier ice, Mountain glaciers, Cirque glaciers, Mathematical models, China—Tian Shan.

46-4163
Pack ice stress measurements.
Comfort, G., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.245-253, 6 refs.
Ritch, R., Frederking, R.M.W.
Pack ice, Ice cover strength, Pressure ridges, Ice deformation, Ice surveys, Ice floes, Ice pressure, Ice loads, Beaufort Sea.

46-4164
Distinct element modelling of ice ridge formation.
Evgin, E., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.255-260, 21 refs.
Frederking, R.M.W., Zhan, C.
Pressure ridges, Ice cover strength, Ice deformation, Ice loads, Ice pressure, Ice friction, Ice breaking, Computerized simulation.

46-4165
Creep of sea ice.
Sinha, N.K., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.261-266, 12 refs.
Zhan, C., Evgin, E.
Ice cover strength, Ice creep, Ice deformation, Sea ice, Ice loads, Ice pressure.

46-4166
Investigations of wedge loading using boundary element analyses for mode 1 macrocracking in ice.
Marcellus, R.W., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.267-272, 17 refs.
Ice cover strength, Ice cracks, Ice loads, Ice deformation, Ice pressure, Ice breaking, Crack propagation, Ice friction, Offshore structures, Ice solid interface, Computerized simulation.

46-4167
Distinct element modelling of load transmission through grounded ice rubble.
Evgin, E., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.273-279, 7 refs.
Zhan, C., Timco, G.W.
Ice cover strength, Ice loads, Ice deformation, Grounded ice, Offshore structures, Ice solid interface, Ice breaking, Ice pressure, Computerized simulation.

46-4168
Improving creep characteristics of ice plates through reinforcement.
Mahrenholtz, O.H., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.281-288, 9 refs.
Wu, Z.
Ice strength, Ice creep, Ice (construction material), Ice deformation, Artificial ice, Strain tests, Ice loads, Offshore structures.

46-4169
Laboratory testing of a flexible boom for ice management.
Loset, S., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.289-295, 11 refs.
Timco, G.W.
Ice booms, Ice control, Oil spills, Oil recovery, Environment simulation, Test chambers, Ice loads.

46-4170
Numerical solution of indentation problem.
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Brown, T.G.
Ice cover strength, Ice loads, Ice deformation, Ice solid interface, Impact tests, Strain tests, Ice pressure, Mathematical models.

46-4171
Winterlude 1986—Dows Lake ice loading test.
Sinha, N.K., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.303-310, 4 refs.
Ice cover strength, Ice loads, Ice deformation, Lake ice, Bearing tests, Strain tests.

46-4172
Ice force and spray ice research at a naturally grounded rubble field.
Weaver, J.S., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.311-317, 8 refs.
Poplin, J.P., Instanes, A., Sayed, M.
Ice cover strength, Ice loads, Grounded ice, Fast ice, Spray freezing, Ice (construction material), Artificial islands, Ice pressure.

46-4173
Sea ice microstructural characteristics relevant to ice *microwave scattering*.
Shokr, M.E., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.319-327, 17 refs.
Sinha, N.K.
Sea ice, Ice microstructure, Ice surveys, Ice surface, Synthetic aperture radar, Radar photography, Ice sampling, Bubbles, Backscattering.

46-4174
Relation of thermal conductivity coefficient with temperature of sea ice in Bohai Sea.
Li, Z.J., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.329-333, 5 refs.
Yan, D.C., Meng, G.L., Zhang, M.Y.
Sea ice, Ice surveys, Ice thermal properties, Ice temperature, Thermal conductivity, Bohai Sea.

46-4175
Testing model ice rubble under proportional strains.
Sayed, M. [illegible]al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.335-341, 17 refs.
Timco, G.W., Sun, L.
Ice cover strength, Ice deformation, Ice pressure, Ice models, Strain tests, Artificial ice, Mathematical models, Test chambers, Compressive properties, Ice loads.

46-4176
Fracture of first-year sea ice: preliminary results.
Bentley, D.L., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.343-348, 18 refs.
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46-4177
Compressive strength of ice cubes of different sizes.
Kuehn, G.A., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.349-356, 17 refs.
Schulson, E.M., Jones, D.E., Zhang, J.
Ice strength, Ice deformation, Ice pressure, Ice loads, Strain tests, Compressive properties.

46-4178
Influence of aging on the strength of prepared cracks in first year sea ice.
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Williams, F.M., Everard, J., Slade, T.D.
Ice cover strength, Ice cracks, Ice deformation, Crack propagation, Ice loads, Sea ice, Strain tests.

46-4179
Confined shear test on multi-layer sea ice.
Yue, Q.J., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.365-368, 15 refs.
Zhou, X.A., Shen, W.
Ice cover strength, Ice deformation, Ice loads, Sea ice, Ice pressure, Strain tests, Shear strength.

46-4180
Laboratory apparatus to measure the behavior of ice rubble.
Timco, G.W., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.369-375, 12 refs.
Funke, E.R., Sayed, M., Laurich, P.H.
Ice cover strength, Ice deformation, Ice pressure, Ice models, Strain tests, Artificial ice, Test equipment, Compressive properties, Ice loads.

46-4181
Fracture toughness of granular freshwater ice.
Weber, L.J., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.377-381, 26 refs.
Nixon, W.A.
Ice strength, Ice deformation, Ice cracks, Ice breaking, Ice loads, Ice pressure, Strain tests, Ice crystal size.

46-4182
Secondary creep rate of steel piles in frozen saline silt.
Nelson, W., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.383-387, 8 refs.
Christopherson, A., Nottingham, D., Somerville, D.
Frozen ground strength, Soil creep, Pile load tests, Frozen ground mechanics, Saline soils, Soil pressure, Frozen ground compression.

46-4183
Creep analysis of a laterally loaded pile in frozen sand.
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Ji, Z.L., Shields, D.H.
Frozen ground strength, Soil creep, Pile load tests, Frozen ground mechanics, Sands, Soil pressure, Frozen ground compression, Mathematical models.

46-4184
Composting process, design and analysis in cold climate.
Ayorinde, O.A., et al, MP 3096, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.409-413, 11 refs.
Reynolds, C.M.
Soil pollution, Waste treatment, Explosives, Roofs, Snow loads, Cold weather performance, Military facilities, Thermal analysis, Heat transfer, Decomposition, Mathematical models.
Composting has been investigated and field-demonstrated at the Louisiana Army Ammunition Plant (LAAP) by the Toxic and Hazardous Materials Agency of the U.S. Army Corps of Engineers as an alternative method of decontaminating explosives-contaminated soils and sediments in a warm environment. Soils and sediments were contaminated with explosive residues as a result of the manufacture, use and disposal of organic-based explosives at military bases and U.S. Army ammunition plants. A preliminary analysis was performed to evaluate the applicability of the LAAP warm-temperature compost design and operation methods to cold environment composting. The results of the analysis were quantitatively compared with the field observations of the winter compost operation at the Badger Army Ammunition Plant (BAAP) in Baraboo, WI.

46-4185
Thermal and hydraulic analysis of a chilled pipeline river crossing.
McGilvary, W.R., et al, MP 3097, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.4. Edited by O.A. Ayorinde, N.K. Sinha, D.S. Sodhi, and W.A. Nixon, New York, American Society of Mechanical Engineers, 1992, p.415-420, 13 refs.
Carlson, R.F.
Underground pipelines, Pipeline freezing, Soil freezing, River crossings, Heat transfer, Frozen ground thermodynamics, Ice accretion, Ice growth, Soil stabilization, Soil pressure, Mathematical models.
A buried, chilled pipeline surrounded by seeping groundwater is analyzed. The pipe is assumed to be located within a convection cell with the surface water temperature varying throughout the year. The volume and moment of the freeze bulb on the pipe are presented as functions of time. The heat transferred to the pipe is also presented. The pipe is assumed to be unable to move independently of the freeze bulb, and estimates of the maximum static horizontal and vertical forces transferred from the freeze bulb to the pipe are presented. Seismic forces associated with acceleration of the pipe and freeze bulb are not discussed in detail, although these may be significant. The accreted ice and soil mass is shown to attain a nearly symmetric shape in wintertime. For the cases investigated, the freeze bulb extends to the stream bed, which may lead to the formation of a dam, either by extension of the freeze bulb itself or by the capture of frazil ice. Upstream scour around the freeze bulb also may be a problem. In addition, there may be environmental impacts on local habitat. If the stream runs dry in the winter, aufeis may form. In the summer, melting at the upstream portion of the freeze bulb leads to an asymmetric "teardrop" shape that gives the frozen mass a significant moment about the pipe center. The freeze bulb diminishes in size and more heat is transferred to the pipe in summer than in winter.

46-4186
Effects of freezing on hydraulic conductivity of compacted clay.
Kim, W.H., et al, *Journal of geotechnical engineering*, July 1992, 118(7), p.1083-1097, 18 refs.
Daniel, D.E.
Soil freezing, Clay soils, Freeze thaw tests, Hygroscopicity, Soil water migration, Damage, Permeability, Linings, Porosity, Soil physics.

46-4187
Radar imagery for Quaternary geological mapping in glaciated terrains.
Singhroy, V.H., et al, *Canadian journal of remote sensing*, Apr. 1992, 18(2), p.112-117, With French summary. 23 refs.
Kenny, F.M., Barnett, P.J.
Glaciation, Radar photography, Terrain identification, Geological surveys, Airborne radar, Synthetic aperture radar, Sensor mapping, Geological maps, Classifications.

46-4188
Analysis of snow cover patterns in a small alpine catchment.
Blöschl, G., et al, *Hydrological processes*, Jan.-Mar. 1992, 6(1), p.99-109, 15 refs.
Kirnbauer, R.
Snow cover distribution, Surface structure, Alpine landscapes, Mapping, Photointerpretation, Topographic effects, Snow hydrology, Runoff forecasting, Correlation.

46-4189
Diagnosing coupled jet-streak circulations for a northern plains snow band from the operational nested-grid model.
Hakim, G.J., et al, *Weather and forecasting*, Mar. 1992, 7(1), p.26-48, 31 refs. For another version see 45-1935.
Uccellini, L.W.
Snowstorms, Snowfall, Atmospheric circulation, Atmospheric physics, Precipitation (meteorology), Wind factors, Advection, Simulation, Weather forecasting.

46-4190
Taku wind of southeast Alaska: its identification and prediction.
Colman, B.R., et al, *Weather and forecasting*, Mar. 1992, 7(1), p.49-64, 22 refs.
Dierking, C.F.
Atmospheric disturbances, Wind (meteorology), Topographic effects, Wind velocity, Atmospheric pressure, Weather forecasting, Wind direction, Fluid dynamics.

46-4191
Field testing of an ice-preserving winter lake aeration system.
Ellis, C.R., et al, *Water resources bulletin*, Dec. 1991, 27(6), p.903-914, 10 refs.
Stefan, H.G.
Limnology, Lake ice, Temperature control, Aeration, Preserving, Oxygen, Water temperature, Photosynthesis, Design, Cold weather tests, Stratification.

46-4192
Remote sensing: global monitoring for Earth management, Vols.1-4.
International Geoscience and Remote Sensing Symposium (IGARSS '90), 11th, Espoo, Finland, Helsinki University of Technology, June 3-6, 1991, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, 2,484p., Refs. passim. For selected papers see 46-4193 through 46-4276.
Putkonen, J., ed.
DLC G70.39.I57 1991
Remote sensing, Synthetic aperture radar, Microwaves, Sea ice, Radiometry, Snow cover, Brightness, Spacecraft, Radar, Data processing, Computer applications, Computer programs.

46-4193
Changes in solar radiation, cloudiness and atmospheric transparency during recent decades.
Russak, V., International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.1, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.53-55, 3 refs.
Remote sensing, Solar radiation, Transparence, Atmospheric physics, Atmospheric density, Cloud cover, Snow cover effect.

46-4194
Processing of remotely sensed data to derive useful input data for the HYDROTEL hydrological model.
Fortin, J.P., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.1, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.63-65, 9 refs.
Bernier, M.
Remote sensing, Hydrology, Models, Computerized simulation, Computer applications, Data processing, Computer programs, Snow cover.

46-4195
Characterization and classification of sea ice in polarimetric SAR data.
Kwok, R., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings] Remote sensing: global monitoring for Earth management, Vol.1, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.81-84, 9 refs.
Drinkwater, M., Pang, A., Rignot, E.
Classifications, Sea ice, Synthetic aperture radar, Ice models, Remote sensing, Analysis (mathematics).

46-4196
Application of neural networks to sea ice classification using polarimetric SAR images.
Kwok, R., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.1, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.85-88, 3 refs.
Sea ice, Synthetic aperture radar, Remote sensing, Classifications.

46-4197
Analysis of polarimetric SAR observations of sea ice.
Israelsson, H., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.1, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.89-92, 7 refs.
Askne, J.
Sea ice, Synthetic aperture radar, Remote sensing, Young ice, Polarization (waves), Pressure ridges.

46-4198
Polarimetric radar measurements of arctic sea ice during the Coordinated Eastern Arctic Experiments.
Onstott, R.G., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.1, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.93-97.
Shuchman, R.A., Wackerman, C.C.
Sea ice, Remote sensing, Ice physics, Synthetic aperture radar, Ice optics, Young ice, Polarization (waves).

46-4199
Stokes matrix statistics in sea ice polarimetric SAR images.
Drinkwater, M.R., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.1, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.99-102, 7 refs.
Kwok, R.
Sea ice, Remote sensing, Polarization (waves), Synthetic aperture radar, Statistical analysis.

46-4200
Distribution of the Stokes parameters and the phase difference in polarimetric SAR data.
Touzi, R., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.1, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.103-106, 9 refs.
Lopes, A.
Sea ice, Remote sensing, Synthetic aperture radar, Polarization (waves), Analysis (mathematics).

46-4201
***Multi-frequency*, multi-polarization SAR and radiometer sea ice classification.**
Drinkwater, M.R., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.1, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.107-111, 13 refs.
Crawford, J.P., Cavalieri, D.J.
Sea ice, Remote sensing, Synthetic aperture radar, Polarization (waves), Radiometry, Classifications, Young ice, Microwaves.

46-4202
Optimal linear combinations of statistics and texture measures for SAR sea ice classification.
Wackerman, C.C., International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.1, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.113-116, 3 refs.
Sea ice, Classifications, Remote sensing, Synthetic aperture radar, Statistical analysis.

46-4203
Sea ice type concentration from MIZEX-87 SAR data.
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Sea ice, Remote sensing, Synthetic aperture radar, Ice cover, Sea ice distribution.

46-4204
Automated extraction of pressure ridges from SAR images of sea ice: comparison with surface truth.
Vesecky, J.F., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.2, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.421-424, 6 refs.
Sea ice, Remote sensing, Synthetic aperture radar, Lasers, Pressure ridges.

46-4205
Radar backscatter from saline ice: measurements and comparison of measurements with theory.
Beaven, S., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.2, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.425-428, 3 refs.
Sea ice, Radar, Backscattering, Ice salinity.

46-4206
Characterization of air-ice-ocean interactive processes in the MIZ based on SAR derived ice edge configurations.
Johannessen, J.A., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.2, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.429-432, 27 refs.
Johannessen, O.M., Sandven, S., Haugan, P.M.
Air ice water interaction, Sea ice, Remote sensing, Synthetic aperture radar, Ice edge.

46-4207
Multi-frequency SAR, SSM/I and AVHRR derived geophysical information of the Marginal Ice Zone.
Shuchman, R.A., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.2, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.781-785, 4 refs.
Sea ice, Remote sensing, Synthetic aperture radar, Ice edge, Geophysical surveys, Airborne radar, Spaceborne photography, Radiometry.

46-4208
Data integration and analysis system for sea ice remote sensing.
Zhang, H., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.2, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.787-790, 8 refs.
Pedersen, L.T., Skriver, H., Gudmandsen, P.
Sea ice, Remote sensing, Data processing.

46-4209
Detection of new sea ice and surface temperature using advanced very high resolution radiometer and special sensor microwave/imager satellite data.
Massom, R.A., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.2, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.791-795, 16 refs.
Comiso, J.
Sea ice, Sea ice distribution, Remote sensing, Surface temperature, Ice cover thickness, Radiometry.

46-4210
Optical extinction and microwave scattering within a seasonally varying snow covered sea ice surface.
Barber, D.G., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.2, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.799-802, 14 refs.
De Abreu, R., LeDrew, E.F.
Sea ice, *Remote sensing*, Models, Ice surface, Snow cover effect, Synthetic aperture radar, Microwaves, Scattering, Snow optics, Seasonal variations.

46-4211
Remote sensing of arctic and sub-arctic floating ice ecology.
Barber, D.G., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.2, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.803-806, 18 refs.
Ni, I.H., LeDrew, E.F.
Sea ice distribution, Remote sensing, Ice edge, Ice detection, Ecosystems, Surface properties, Synthetic aperture radar.

46-4212
Detecting new ice in the Arctic from infrared multispectral data of AVHRR.
Martin, T., International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.2, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.807-809, 5 refs.
Sea ice distribution, Sea ice, Remote sensing, Ice detection, Ice models, Ice optics, Brightness, Infrared photography, Radiometry.

46-4213
MOS-1 multi-sensor data set for sea ice monitoring; Japanese contribution to ISY/PIE Program.
Cho, K., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.2, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.811-814, 6 refs.
Sea ice distribution, Remote sensing, Sensors, Spaceborne photography, Radiometry, Brightness, Infrared reconnaissance, Antarctica—Showa Station, Antarctica—Princess Ragnhild Coast, Okhotsk Sea.
Japan's first polar orbiting earth observation satellite series, MOS-1 and MOS-1b, carry three different sensors, which are MESSR, VTIR and MSR. The great advantage of MOS-1 is that it can observe the same phenomena by three different sensors at the same time. In order to contribute to the ISY (International Space Year)/PIE (Polar Ice Extent) Program, NASDA and related agencies in Japan plan to produce a MOS-1 multisensor data set of antarctic region, the Okhotsk Sea and the arctic region. This paper describes the use of the data set for sea ice study and monitoring, and the further plan to produce the MOS-1 data set for ISY/PIE. (Auth.)

46-4214
Relations between ice motion observed from AVHRR and wind in the Greenland Sea.
Zhang, H., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.2, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.815-818, 7 refs.
Gudmandsen, P.
Sea ice, Sea ice distribution, Remote sensing, Radiometry, Velocity, Wind factors, Greenland Sea.

46-4215
Using of radiolocation measuring devices of sea ice thickness.
Peshkov, A.N., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.2, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.819.
Sea ice, Remote sensing, Ice cover thickness, Measuring instruments, Airborne radar, Radar echoes.

46-4216
Active microwave observations of arctic sea ice during the fall freeze-up.
Onstott, R.G., International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.2, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.821-824, 3 refs.
Sea ice, Microwaves, Remote sensing, Freezeup, Ice physics, Radar echoes.

46-4217
Towards predicting under-ice drafts in the Beaufort and Chukchi Seas.
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46-4249
Antarctic tabular iceberg multi-sensor mapping.
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Icebergs, Remote sensing, Sensor mapping, Radiometry, Microwaves.
The remote sensing resources to track and observe the characteristics (shape and height) of antarctic tabular icebergs have advanced significantly. The main observing system of visible and infrared imagery from the polar orbiting satellites is severely limited by clouds and low light levels. These sensor spectral disadvantages are alleviated by using 25 km passive microwave Special Sensor Microwave Imager (SSM/I) data that can detect these huge bergs during adverse weather conditions. Spaceborne altimeters like GEOSAT, while limited to nadir viewing only, are also capable of distinguishing iceberg "hits" due to the change in backscatter and elevation during satellite overflights. Examples combining these three sensors illustrate a means of data fusion, necessary to detect and map tabular icebergs for studies ranging from ocean circulation to potential global climate changes. (Auth.)

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46-4254
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46-4262
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Satellite observations of polar lows by SSM/I, GEOSAT and TOVS.
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Subsurface radar: principal problems of development and practical use.
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Remote sensing, Sea ice, Ice cover thickness, Geophysical surveys, Radar, Subsurface investigations.

46-4266
Snow and glacier mapping in alpine regions with polarimetric SAR.
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Dozier, J., Rott, H., Davis, R.E.
Remote sensing, Mapping, Microwaves, Synthetic aperture radar, Snow cover distribution, Glaciers, Classifications, Analysis (mathematics).
The objective of this study is to examine the capability of mapping snow and glacier in alpine regions using SAR radar imagery when topographic information is not available. The topographic effects on the received power for a resolution cell can be explained by the change in an illumination area and an incidence angle in a slant-range representation of SAR imagery. The specific polarization signature has been found to be relatively independent of both illumination area and incidence angle for a pixel resolution, and provides a suitable measurement data set for snow and glacier mapping in a high relief area. The results show that the C-band images of the enhancement factor, which is the ratio of synthesized image to the total power, provide the capability of discrimination between snow, glacier and rock regions.

46-4267
Evaluation of the potential of C- and X-band SAR data to monitor dry and wet snow cover.
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46-4268
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46-4269
Analysis of brightness temperature of snow-covered terrain.
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46-4270
Snow properties from passive microwave observations of Antarctica.
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Remote sensing, Microwaves, Brightness, Polarization (waves), Mathematical models, Snow physics, Snow density, Snow depth, Radiometry.
A time series of passive microwave observations by the Special Sensor Microwave Imager (SSM/I) instrument of the antarctic plateau reveals the annual variation of the snow brightness temperatures at 19 and 37 GHz. The dielectric constant of ice is relatively constant with temperature and frequency, but the observations show significant variation in the brightness temperatures at the two frequencies. This indicates an annual change in surface parameters. The polarization of the microwave emission is seen to be too high to be attributed to surface effects alone and is explained through a model for emission from a layered medium. (Auth.)

46-4271
Microwave signature measurements of antarctic firn.
Rott, H., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.4, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.2333-2336, 7 refs.
Sturm, K.
Microwaves, Remote sensing, Backscattering, Firn, Brightness, Radiometry, Snow density, Antarctica--Georg von Neumayer Station, Antarctica--Queen Maud Land.
Emission and backscattering signatures in the C- and X-band as a function of the incidence angle were measured for various types of polar firn during an oversnow traverse leading from the German antarctic station Georg von Neumayer to the plateau of the Amundsen Ice. The polarization behavior and angular dependence of emission and backscattering were found to be strongly dependent on the internal stratification of the snow pack. The largest polarization differences in emitted radiation were observed at the Amundsen Ice, where many pronounced depth hoar layers were found in the top several meters of the snowpack. The field measurements, as well as the analysis of spaceborne microwave radiometer measurements by the Nimbus-7 SMMR and the DMSP SSM/I, show strong deviations from the behavior of a Rayleigh- or Mie-scattering medium, on which models of microwave interaction with snow are based. (Auth.)

46-4272
***Design of the ESA multiband imaging microwave* radiometer MIMR.**
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Reynolds, M.
Microwaves, Radiometry, Remote sensing, Radiation measuring instruments, Design, Spacecraft, Geophysical surveys, Permafrost distribution, Sea ice distribution, Snow cover, Snow water content, Ice cover, Soil water.

46-4273
Development of geophysical algorithms for a spaceborne microwave radiometer system.
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Microwaves, Radiometry, Spacecraft, Remote sensing, Geophysical surveys, Imaging, Sea ice distribution, Snow water equivalent, Soil water, Snow cover distribution.

46-4274
Simulation software for a satellite-borne radiometer system.
Kärnä, J.P., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.4, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.2373-2375, 11 refs.
Pulliainen, J., Hallikainen, M.
Computer programs, Computerized simulation, Remote sensing, Radiometry, Microwaves, Sea ice, Sea ice distribution, Snow cover distribution, Snow water equivalent, Water vapor.

46-4275
Evidences of glaciogenic features perceived by SPOT-HRV. Example in the French Massif Central.
Deroin, J.P., et al, International Geoscience and Remote Sensing Symposium (IGARSS '91), Espoo, Finland, Helsinki University of Technology, June 3-6, 1991. [Proceedings]. Remote sensing: global monitoring for Earth management, Vol.4, New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p.2469-2472, 5 refs.
Remote sensing, Imaging, Radiometry, Glacial geology, Geomorphology.

46-4276
Digital processing by sea ice thickness measuring.
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Finkel'shtein, M.I.
Ice cover thickness, Data processing, Measuring instruments, Remote sensing, Radar photography, Photointerpretation.

46-4277
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Barksdale, R.D., ed, Washington, D.C., National Stone Association, 1991, Var. p. (Pertinent p.3/46-3/47, 3/50-3/51, 3/55, 11/51-11/53, 12/21-12/28, 13/11-13/12), Refs. passim.
Concrete aggregates, Soil aggregates, Construction materials, Freeze thaw tests, Frost resistance.

46-4278
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Cold weather survival, Military operation.

46-4279
Biennial report 1989-1990.
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Organizations, Research projects, Polar atmospheres, Sea ice, Permafrost, Glacier surveys, Snow surveys.

46-4280
Proceedings. Vol.5, Part A.
International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992, New York, American Society of Mechanical Engineers, 1992, 275p., Refs. passim. For selected papers see 46-4281 through 46-4287.
Barbas, S.T., ed.
Pipelines, Pipe laying, Design criteria, Building codes.

46-4281
Four years after, unsolicited comments and update to Canadian government reference manual "Arctic Offshore Pipeline Systems".
Fernández, M.L., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.5, Part A. Edited by S.T. Barbas, et al, New York, American Society of Mechanical Engineers, 1992, p.75-83, 4 refs.
Pipelines, Pipe laying, Offshore structures, Ice scoring, Trenching, Design criteria, Building codes, Safety.

46-4282
Development of a limit states guideline for the pipeline industry.
Zimmerman, T.J.E., et al, International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.5, Part A. Edited by S.T. Barbas, et al, New York, American Society of Mechanical Engineers, 1992, p.85-89, 24 refs.
Price, P.S.J., Colquhoun, I.R., Smith, R.J.
Pipelines, Pipe laying, Design criteria, Building codes, Frost heave, Ultimate strength, Statistical analysis.

46-4283
Codes and standards and the regulation of pipelines.
Yungblut, G.R., International Conference on Offshore Mechanics and Arctic Engineering, 11th, Calgary, Alberta, June 7-12, 1992. Proceedings. Vol.5, Part A. Edited by S.T. Barbas, et al, New York, American Society of Mechanical Engineers, 1992, p.91-95.
Pipelines, Pipe laying, Design criteria, Building codes, Legislation.

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Arctic pipelines and codes/standards and regulations.
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Pipelines, Pipe laying, Design criteria, Building codes, Legislation, Frost heave, Permafrost preservation.

46-4285
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Pipelines, Pipe laying, Ice scoring, Icebergs.

46-4286
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Sause, R., Ford, G.W., Row, D.G.
Suspended pipelines, Wind pressure, Wind factors, Vibration, Pipe laying, Damping.

46-4287
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Houser, M.
Pipe laying, Soil conservation, Cold weather construction, Construction equipment, Soil stabilization, Cost analysis.

46-4288
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Reinmann, J.J., ASME Winter Annual Meeting, Atlanta, GA, Dec. 1-6, 1991, New York, American Society of Mechanical Engineers, 1991, 10p., 38 refs.
Aircraft icing, Ice removal, Ice forecasting, Wind tunnels, Computerized simulation.

46-4289
Determination of anti-icing fluid degradation using gradient index optics.
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Muller, M.R., McDonald, M.C.
Aircraft icing, Ice detection, Chemical ice prevention, Antifreezes, Ice optics, Light transmission, Films, Refraction.

46-4290
Hydrologic similarities in maritime and continental basins.
Williams, M.W., et al, American Geophysical Union 12th Annual Hydrology Days, Fort Collins, CO, Mar. 31-Apr. 3, 1992. Proceedings, Atherton, CA, Hydrology Days Publications, 1992, p.338-351, 25 refs.
Caine, N.
Snowmelt, Snow hydrology, Runoff, Stream flow, Drainage, Watersheds, Alpine landscapes.

46-4291
Surface tension parameters of ice obtained from contact angle data and from positive and negative particle adhesion to advancing freezing fronts.
Van Oss, C.J., et al, *Journal of adhesion science and technology*, 1992, 6(4), p.503-516, 32 refs.
Ice adhesion, Freezing front, Surface energy, Ice water interface, Ice surface, Liquid solid interfaces, Mathematical models.

46-4292
Analytical modelling of the performance of a snow deposit under compression loading.
Yong, R.N., et al, European Conference of Terrain Vehicle Systems, 5th, Budapest, 1991, [1991], p.222-233, 7 refs.
Mohamed, A.M.O., Murcia, A.J.
Snow strength, Snow compression, Snow hardness, Snow loads, Snow deformation, Snow density, Snow cover stability, Trafficability, Mathematical models.

46-4293
Alkalinity measurements in water extracts of calcareous soils.
Marion, G.M., et al, *Soil Science Society of America Journal*, Mar.-Apr. 1992, 56(2), MP 3099, p.598-600, 18 refs.
Schiesinger, W.H., Fonteyn, P.J.
Soil chemistry, Soil composition, Solubility, Soil tests.
In soil carbonate solubility studies, it is usually assumed that total alkalinity is equal to inorganic-C alkalinity. Recent studies have raised questions about the validity of this assumption. This study reexamined previously published soil data from grass-oak (*Quercus* spp.) woodlands and deserts to test the hypothesis that total alkalinity is equal to inorganic-C alkalinity. Total alkalinity was measured with strong-acid titration, while inorganic-C alkalinity was calculated from pH and the partial pressure of CO2 (pCO2) measurements. Within the limits of error, calculated inorganic C alkalinity was equal to measured total alkalinity. A recommendation was made for overdetermining the state of experimental systems in solubility studies; this allows one to check the internal consistency of experimental measurements, equilibrium constants, and model assumptions.

46-4294
Confined compressive strength of horizontal first-year sea ice samples.
Richter-Menge, J.A., *Journal of offshore mechanics and arctic engineering*, Nov. 1991, Vol.113, MP 3100, p.344-351, 30 refs. For another version see 41-2422.
Ice cover strength, Ice pressure, Ice deformation, Strain tests, Compressive properties, Sea ice, Ice loads.
A total of 110 first-year sea ice samples from Prudhoe Bay, AK, were tested in unconfined and confined constant strain rate compression. All of the tests were performed in the laboratory on a closed-loop electrohydraulic testing machine at -10°C. The confined tests were performed in a conventional triaxial cell (sigma1 > sigma2 = sigma3) that maintained a constant ratio between the radial and axial stress (sigma2/sigma1 = constant) to simulate true loading conditions. Three strain rates (.01, .001, and .00001/s) and three sigma2/sigma1 ratios (0.25, 0.50, and 0.75) were investigated. This paper summarizes the field sampling and testing techniques and presents data on the effect of confinement on the compressive strength, initial tangent modulus, and failure strain of the ice.

46-4295
Measurement of heat losses from hot water heat distribution systems.
Phetteplace, G.E., MP 3101, International District Heating and Cooling Association, 83rd Annual Meeting, Danvers, MA, June 12-17, 1992. Proceedings, Washington, D.C., 1992, p.301-315, 12 refs.
Heat loss, Radiant heating, Heat transfer, Water pipes, Steam, Military facilities, Cost analysis.
This paper describes two field projects underway at U.S. Army bases. At Fort Jackson, SC, a medium-temperature hot water heat distribution system is being monitored. Three different types of system constructions have been instrumented: pipes enclosed in a shallow concrete trench, steel conduit with supply and return pipes in common conduit, and separate steel conduits for supply and return pipes. At Ft. Irwin, CA, a low-temperature hot water system is being monitored. Two sites have been instrumented on this direct buried system that consists of steel carrier pipes insulated with polyurethane foam protected by a fiberglass jacket. The heat losses from these systems are being monitored.

46-4296
Taku Glacier advance—preliminary analysis.
Motyka, R.J., *Alaska. Division of Geological and Geophysical Surveys. Public-data file*, Apr. 1989, No.89-12, 30p., 15 refs.
Glacier surveys, Glacier oscillation, Glacier alimentation, Glacier mass balance, Ice dams, Glacial lakes, United States—Alaska—Taku Glacier.

46-4297
Ramming model tests of the MV *Canmar Kigoriak*.
Nyman, T., et al, *Finland. Technical Research Centre. Research notes*, May 1991, No.1251, 57p. + append., PB92-147933, 7 refs.
Kivimaa, S.
Icebreakers, Ice breaking, Ice loads, Ice cover strength, Ice solid interface, Environment simulation, Penetration tests, Impact tests.

46-4298
Hydrological yearbook 1987-1988. [Hydrologinen vuosikirja 1987-1988],
Leppäjärvi, R., ed, Helsinki, Vesi- ja umpäristöhallitus (National Board of Waters and the Environment), 1991, 207p., In Finnish, English, and Swedish.
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46-4299
Air temperature and precipitation data, 1967-88, Wolverine Glacier basin, Alaska.
Mayo, L.R., et al. *U.S. Geological Survey. Open-file report*, 1992, No.91-246, 80p., 20 refs.
March, R.S., Trabant, D.C.
Air temperature, Precipitation (meteorology), Glacial meteorology, Glacial hydrology, Glacier surveys, United States Alaska Wolverine Glacier.

46-4300
Ice thickness climatology, 1961-1990 normals. Ottawa, Environment Canada, Atmospheric Environment Service, Ice Climatology Services, Ice Centre, 1992, 277p., In English and French. 33 refs.
Ice surveys, Ice cover thickness, River ice, Lake ice, Snow depth, Snow ice interface, Canada.

46-4301
Oceanographic data of the 31st Japanese Antarctic Research Expedition from November 1989 to March 1990.
Ikeda, S., et al. *Japanese Antarctic Research Expedition. JARE data reports*, Mar. 1992, No.174, 52p.
Kojima, T.
Oceanographic surveys, Water temperature, Air temperature, Salinity, Ocean currents, Tidal currents, Water chemistry, Antarctica.

46-4302
On a multiaxial constitutive law for ice.
Szyszkowski, W., et al. *Mechanics of materials*, 1986, Vol.5, p.49-71, 16 refs.
Glockner, P.G.
Ice deformation, Ice creep, Ice cover strength, Ice loads, Ice pressure, Ice cracks, Ice elasticity, Mathematical models.

46-4303
Actions on structures: snow loads.
International Council for Building Research, Studies, and Documentation. *CIB report. Publication*, Sep. 1991, No.141, 43p. + appends., 94 refs.
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46-4304
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Caflisch, A.
Hydrology, Bibliographies, Snow surveys, Glacier surveys, Avalanches, Switzerland.

46-4305
Shotcrete: frost resistance.
Nordtest, Espoo, Finland, 1991, 2p., 1 ref.
Concrete freezing, Frost resistance, Low temperature tests, Concrete strength, Freeze thaw tests.

46-4306
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QW Communications Company, Concord, NH, 1992, Var. p.
Organizations, Research projects, Bibliographies.

46-4307
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Carleton University. Geotechnical Science Laboratories, Ottawa, July 1991, 48p. + appends., 14 refs.
Underground pipelines, Pipeline freezing, Frost heave, Freeze thaw tests, Soil freezing, Permafrost beneath structures, Frozen ground thermodynamics.

46-4308
Canada-France pipeline—ground freezing experiment: phase IX, fourth thaw.
Carleton University. Geotechnical Science Laboratories, Ottawa, June 1991, 38p., 28 refs.
Underground pipelines, Pipeline freezing, Frozen ground settling, Thaw consolidation, Frost heave, Freeze thaw tests, Soil freezing.

46-4309
Ice and water: the flood of 1992, Montpelier, Vermont. Montpelier, VT, 1992, n.p.
Floods, Ice jams, Ice dams, Snowstorms, United States Vermont Montpelier.

46-4310
Hydrogen peroxide retention in rime ice.
Snider, J.R., et al. *Journal of geophysical research*, May 20, 1992, 97(D7), p.7569-7578, 43 refs.
Montague, D.C., Vali, G.
Cloud physics, Ice vapor interface, Ice formation, Ice composition, Mass transfer, Vapor diffusion, Chemical composition, Air pollution.

46-4311
Characteristics of antarctic stratospheric aerosols during the 1987 ozone depletion episode based on SAGE II satellite observations.
Lin, N.H., et al. *Journal of geophysical research*, May 20, 1992, 97(D7), p.7635-7649, 69 refs.
Saxena, V.K.
Polar atmospheres, Atmospheric composition, Aerosols, Stratosphere, Particle size distribution, Sampling, Air pollution, Atmospheric density.
In this study, features of antarctic stratospheric aerosols during the ozone depletion episode of Oct. 1987 are investigated based on the SAGE II (Stratospheric Aerosol and Gas Experiment II) data. The study focuses on (1) inferring the aerosol size spectrum using a modified randomized minimization search technique and (2) investigating the vertical, zonal, and columnar averages of aerosol properties such as extinction coefficient, optical depth, mean and effective radii, mass loading, total number concentration, and surface area concentration, together with the ozone concentration. On the average, in the region below 18 km, maximum values for the parameters of mass loading, total number, and surface area concentration were found to be located just above the region of the most severe ozone depletion. As to the columnar aerosol properties, a bimodal feature in the size distribution is found during the days when the peak values of optical depth are greater than .001. Relatively abundant population of smaller particles is associated with the region of severe ozone depletion. The distinct latitudinal gradients of these aerosol parameters suggest that the stratospheric aerosols are separated into two regimes near 62-63S, probably as a result of the dynamics introduced by polar vortex. Smaller and larger particles dominate at higher and lower latitudes, respectively. The average amount is about 95 DU (Dobson units) with the amplification of about 48 DU. It is pointed out that the reported features of the stratospheric aerosols in the antarctic region are useful in providing insights into the mechanisms for ozone depletion. (Auth. mod.)

46-4312
Effect of filtration flow on the equilibrium shape of bodies formed by forced freezing.
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Mukhamadullina, G.I.
Frozen rocks, Physical properties, Frozen ground mechanics, Seepage, Ice solid interface, Boundary value problems, Solidification, Analysis (mathematics), Heat flux, Boreholes.

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Use of fractional exponential creep kernels for long-term behavior of laterally loaded piles in permafrost.
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Ladanyi, B.
Pile structures, Foundations, Permafrost beneath structures, Loading, Soil creep, Frozen ground mechanics, Static stability, Analysis (mathematics), Forecasting.

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Simplified model for a weakly unstable atmospheric boundary layer capped by an inversion layer.
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Atmospheric physics, Boundary layer, Sea ice, Ice air interface, Air flow, Surface roughness, Temperature inversions, Wind velocity, Mathematical models, Stratification.

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Recent pollen rain in some alpine and sub-alpine environments in the southern parts of the Scandinavian mountains and its bearing on investigations of Holocene forest-line shifts.
Königsson, L.K., *Acta botanica Fennica*, 1992, Vol.144, p.19-34, 19 refs.
Alpine landscapes, Quaternary deposits, Forest lines, Palynology, Vegetation patterns, Sediment transport, Periodic variations, Plants (botany), Peat.

46-4316
Heat pipes for utilization of alternative sources of heat and cold.
Vasil'ev, L.L., *Heat transfer—Soviet research*, 1991, 23(5), p.693-702, Translated from Vestsi Akademīi navuk BSSR. Seriia fizika-energetichnikh navuk, 1990, No.1. 9 refs.
Heat pipes, Heat sources, Soil freezing, Frost protection, Heat transfer, Performance, Heat recovery.

46-4317
Changes in C storage by terrestrial ecosystems: how C-N interactions restrict responses to CO2 and temperature.
Rastetter, E.B., et al. *Water, air, and soil pollution*, Aug. 1992, 64(1-2), Natural Sinks of CO2: International Workshop, Palmas Del Mar, Puerto Rico, Feb. 24-27, 1992. Proceedings. Edited by J. Wisniewski et al, p.327-344, Refs. p.341-344.
McKane, R.B., Shaver, G.R., Melillo, J.M.
Tundra, Forest ecosystems, Climatic changes, Carbon dioxide, Nutrient cycle, Air temperature, Chemical analysis, Temperature effects, Simulation.

46-4318
Influence of presaturation and freeze-thaw test conditions on length changes of portland cement mortar.
Chandra, S., et al. *Cement and concrete research*, July 1992, 22(4), p.515-524, 10 refs.
Xu, A.
Cements, Mortars, Deterioration, Thermal expansion, Freeze thaw tests, Saturation, Salt water, Salting, Road maintenance.

46-4319
Snow-melting system using river water heated by groundwater.
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Railroad tracks, Snow removal, Snow melting, Wells, Ground water, Artificial melting, Heat sources, Water temperature, Rivers.

46-4320
Optimum heat insulator for adiabatic icicle prevention on existing tunnel in considering statistical atmospheric conditions.
Okada, K., *Railway Technical Research Institute. Quarterly report*, Jan. 1989, 30(1), p.18-24, 10 refs.
Railroad tunnels, Ice formation, Dendritic ice, Ice prevention, Protective coatings, Thermal insulation, Linings, Snow cover effect, Design, Statistical analysis.

46-4321
Prevention of snow accretion to and its dropping from car body using a panel-heater.
Fujii, T., et al. *Railway Technical Research Institute. Quarterly report*, Sep. 1991, 32(3), p.174-181, 4 refs.
Endo, T., Imai, T.
Railroad cars, Artificial melting, Railroad equipment, Snow melting, Ice accretion, Electric heating, Snow removal, Ice solid interface, Heat capacity, Cold weather tests.

46-4322
Development and experiment of a water sprinkling model with variable flow for snow melting on railway tracks.
Sawase, K., et al. *Railway Technical Research Institute. Quarterly report*, Dec. 1991, 32(4), p.251-257, 3 refs.
Kojima, T.
Railroad tracks, Railroad equipment, Snow removal, Artificial melting, Water flow, Dispersions, Design, Performance, Flow rate.

46-4323
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Patlak, M., *National Research Council. News-Report*, June-July 1992, 42(4), p.21-23.
Research projects, Climatic changes, Global warming, International cooperation, Ecosystems, Meetings.

46-4324
Evaluation of low-temperature properties of dispersion media in lubricating greases.
Matveeva, O.I., et al, *Chemistry and technology of fuels and oils*, May 1992, 27(9-10), p.522-525, Translated from Khimiia i tekhnologiia topliv i masel, 1991, No.9. 7 refs.
Sazonova, N.S., Volobuev, N.K., Skriabina, T.G.
Lubricants, Cold weather performance, Viscosity, Synthetic materials, Temperature measurement, Thermal analysis, Melting points, Mechanical properties.

46-4325
Formulating the reverse problem for studying frost formation processes.
Romanovskiĭ, M.R., *Chemical and petroleum engineering*, July 1992, 27(11-12), p.701-704, Translated from Khimicheskoe i neftianoe mashinostroenie, 1991, No.12. 4 refs.
Cryogenics, Hoarfrost, Ice formation, Thermal conductivity, Ice temperature, Temperature distribution, Ice solid interface, Ice thermal properties.

46-4326
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Yoo, H., et al. *International journal of heat and fluid flow*, Dec. 1991, 12(4), p.365-374, 20 refs.
Ro, S.T.
Liquid solid interfaces, Phase transformations, Melting, Convection, Density (mass/volume), Heat transfer coefficient, Mathematical models.

46-4327
Inhibition of ice crystal growth by fish antifreezes.
Raymond, J.A., et al. *American Chemical Society symposium series*, 1991, No.444, Surface reactive peptides and polymers: discovery and commercialization. Edited by C.S. Sikes et al, p.249-255, 19 refs.
DeVries, A.L.
Cryobiology, Antifreezes, Ice crystal growth, Ice crystal structure, Chemical properties, Chemical ice prevention, Molecular structure, Orientation.

46-4328
Crystallization of ice from aqueous solutions in suspension crystallizers.
Shi, Y.P., et al. *American Chemical Society symposium series*, 1990, No.438, Crystallization as a separations process. Edited by A.S. Myerson et al, p.316-328, 10 refs.
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Solutions, Ice crystal growth, Ice nuclei, Freezing rate, Phase transformations, Heat balance, Manufacturing.

46-4329
Technology transfer in snow control engineering.
Martinelli, M., Jr., et al. *Journal of technology transfer*, 1982, 6(2), p.27-37, 33 refs.
Schmidt, R.A., Jr., Tabler, R.D.
Road maintenance, Snow removal, Snow fences, Research projects, Forecasting, Design criteria, Countermeasures.

46-4330
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Tanis, F.J., et al. *SPIE—The International Society for Optical Engineering. Proceedings*, 1990, Vol.1302, Ocean optics 10. Edited by R.W. Spinrad, p.225-237, 17 refs.
Manley, T.O., Mitchell, B.G.
Sea ice, Ice edge, Remote sensing, Radiometry, Radiance, Ocean currents, Upwelling, Chlorophyll, Optical properties, Surface temperature.

46-4331
Multilayer radiative transfer model for translucent geophysical surfaces with specific application to sea ice.
Grenfell, T.C., *SPIE—The International Society for Optical Engineering. Proceedings*, 1990, Vol.1302, Ocean optics 10. Edited by R.W. Spinrad, p.532-544, 22 refs.
Sea ice, Ice optics, Albedo, Snow cover effect, Ice models, Algae, Light transmission, Attenuation.

46-4332
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Gilbert, G.D., et al. *SPIE—The International Society for Optical Engineering. Proceedings*, 1990, Vol.1302, Ocean optics 10. Edited by R.W. Spinrad, p.545-555, 6 refs.
Schoonmaker, J.S.
Sea ice, Ice temperature, Ice optics, Light scattering, Attenuation, Wave propagation, Temperature effects, Lasers, Diffusion, Ice structure.

46-4333
Image analysis applied to black ice detection.
Chen, Y., *SPIE—The International Society for Optical Engineering. Proceedings*, 1991, Vol.1468, Applications of artificial intelligence 9. Edited by M.M. Trivedi, p.551-562, 17 refs.
Road icing, Ice detection, Image processing, Classifications, Surface properties, Reflectivity, Remote sensing, Safety, Analysis (mathematics).

46-4334
PC-based hardware implementation of the maximum-likelihood classifier for the Shuttle ice detection system.
Jaggi, S., *SPIE—The International Society for Optical Engineering. Proceedings*, 1991, Vol.1452, Image processing algorithms and techniques 2. Edited by M.R. Civanlar et al, p.340-350, 2 refs.
Spacecraft, Icing, Ice detection, Classifications, Image processing, Computer applications, Infrared photography, Statistical analysis.

46-4335
Measuring air from polar vortices.
Roscoe, H.K., *Nature*, Mar. 21, 1991, Vol.350, p.197-198, 4 refs.
Atmospheric composition, Ozone, Polar atmospheres, Stratosphere, Atmospheric circulation, Balloons, Meteorological instruments.

46-4336
Snow cover models in operational weather forecasting.
Vehviläinen, B., *Finland. National Board of Waters and the Environment. Water and Environment Research Institute. Publications*, 1992, No.11, 112p., With Finnish summary. Refs. p.87-91
Snowmelt, Runoff forecasting, Snow cover distribution, Flood forecasting, Degree days, Snow melting, Snow heat flux, Watersheds, Snow surveys, Snow water equivalent, Mathematical models.

46-4337
Engineering aspects of metal-waste management.
Iskandar, I.K., ed, MP 3102, Chelsea, MI, Lewis Publishers, 1992, 231p., Proceedings of a workshop that was part of the International Conference on Metals in Soils, Waters, Plants, and Animals, Orlando, FL, Apr. 30-May 3, 1990. Refs. passim. For selected paper see 46-4338.
Selim, H.M., ed.
Waste treatment, Soil pollution, Soil chemistry, Metals, Soil microbiology, Statistical analysis, Mathematical models.

46-4338
Microwave digestion procedures for characterizing metal contaminated soils: applications, limitations and projected capabilities.
Reynolds, C.M., MP 3103, Engineering aspects of metal-waste management. Edited by I.K. Iskander and H.M. Selim, Chelsea, MI, Lewis Publishers, 1992, p.49-61, 50 refs.
Soil pollution, Soil chemistry, Metals, Soil tests, Chemical analysis, Microwaves.

46-4339
Climate of the northern latitudes: past, present and future.
Hald, M., ed, *Norsk geologisk tidsskrift*, Oct. 1991, 71(3), p.129-234, Extended abstracts from an international conference held in Tromsö, Norway, Apr. 2-4, 1990. Refs. passim. For individual papers see 46-4340 through 46-4365.
Henriksen, K., ed, Larsen, E., ed, Vorren, K.D., ed.
Paleoclimatology, Polar atmospheres, Air ice water interaction, Atmospheric composition, Atmospheric circulation, Bottom sediment, Drill core analysis, Glacier oscillation, Global change, Marine deposits, Ocean currents, Ozone.

46-4340
Interpretation of laminated sediments from glacier-fed lakes, northwest Spitsbergen.
Cromack, M., *Norsk geologisk tidsskrift*, Oct. 1991, 71(3), *Climate of the northern latitudes: past, present* and future. Edited by M. Hald, et al, p.121-132, 8 refs.
Paleoclimatology, Glacial lakes, Glacial deposits, Lacustrine deposits, Bottom sediment, Drill core analysis, Age determination, Norway—Spitsbergen.

46-4341
Early Weichselian climate in Finland.
Forsström, L., *Norsk geologisk tidsskrift*, Oct. 1991, 71(3), Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.133-136, 33 refs.
Paleoclimatology, Glacial deposits, Paleobotany, Vegetation patterns, Stratigraphy, Finland.

46-4342
Early decay of the Barents shelf ice sheet—spread of stable isotope signals across the eastern Norwegian Sea.
Weinelt, M.S., et al, *Norsk geologisk tidsskrift*, Oct. 1991, 71(3), Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.137-140, 13 refs.
Sarnthein, M., Vogelsang, E., Erlenkeuser, H.
Paleoclimatology, Bottom sediment, Glacier melting, Marine deposits, Meltwater, Drill core analysis, Ocean currents, Isotope analysis, Norwegian Sea.

46-4343
Late Quaternary paleoceanography in the southern Barents Sea.
Hald, M., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3), Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.141-144, 27 refs.
Paleoclimatology, Bottom sediment, Glacier melting, Marine deposits, Meltwater, Drill core analysis, Ocean currents, Isotope analysis, Barents Sea.

46-4344
Spatial and temporal distribution of Laurentide and Fennoscandian meltwater during the last deglaciation.
Jones, G.A., *Norsk geologisk tidsskrift*, Oct. 1991, 71(3), Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.145-148, 15 refs.
Paleoclimatology, Bottom sediment, Glacier melting, Marine deposits, Meltwater, Drill core analysis, Isotope analysis, Salinity.

46-4345
Ice-sheet ocean interaction at the mouth of Hudson Strait, Canada, as a trigger for Younger Dryas cooling.
Miller, G.H., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3), Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.149-151, 9 refs.
Kaufman, D.S., Ice-sheet ocean interaction in the Younger Dryas.
Paleoclimatology, Marine deposits, Glacier oscillation, Air ice water interaction, Sea ice distribution, Icebergs.

46-4346
Climate of the northern latitudes as a function of ocean/atmosphere circulation and the Earth's rate of rotation.
Mörner, N.A., *Norsk geologisk tiasskrift*, Oct. 1991, 71(3), Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.153-154, 9 refs.
Paleoclimatology, Polar atmospheres, Ocean currents, Atmospheric circulation.

46-4347
Role of ice sheets in the Pleistocene climate.
Oerlemans, J., *Norsk geologisk tidsskrift*, Oct. 1991, 71(3), Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.155-161, 30 refs.
Polar atmospheres, Glacier mass balance, Air ice water interaction, Ice sheets, Radiation balance, Glacier oscillation, Global change, Ocean currents, Atmospheric circulation, Pleistocene, Paleoclimatology.
Ice sheets have played an important role in the climatic evolution of the Pleistocene. The characteristic time-scale of ice-sheet growth has the same order-of-magnitude as that for the orbital insolation variations. The interaction with the solid earth, the importance of the thermal conditions at the base of ice sheets and feedback on the climate system (albedo feedback, precipitation regime) make the cryospheric response to climatic forcing complicated. Rapid ice-sheet decay, as observed in the paleorecord, must have involved one or more powerful destabilizing mechanisms like low accumulation rates at subpolar latitudes, high ice velocities due to water-saturated sediment beds, and high calving rates in proglacial lakes and seas. In terms of radiative forcing of the global climatic fluctuations in the Pleistocene, the effects of ice sheets (albedo), varying concentration of greenhouse gases (carbon dioxide, methane) and direct effect of orbital changes (insolation) are of similar magnitude. Arctic and antarctic ice sheets are compared. (Auth. mod.)

46-4348
Late Cenozoic benthonic foraminiferal stratigraphy from outer Björnöyrenna, Barents Sea: palaeoclimatic implications.
Poole, D.A.R., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3), Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.163-165, 19 refs.
Paleoclimatology, Bottom sediment, Marine deposits, Drill core analysis, Stratigraphy, Fossils, Glacier oscillation, Barents Sea.

46-4349
Notes on long-term forcing of arctic climate.
Ruddiman, W.F., *Norsk geologisk tidsskrift*, Oct. 1991, 71(3), Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.167-168, 17 refs.
Paleoclimatology, Polar atmospheres, Global change, Tectonics, Atmospheric circulation.

46-4350
Modern benthic foraminiferal distribution in the southwestern Barents Sea: paleo-oceanographic applications.
Steinsund, P.I., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.169-171, 11 refs.
Hald, M., Poole, D.A.R.
Paleoclimatology, Bottom sediment, Marine biology, Sea ice distribution, Biogeography, Barents Sea.

46-4351
Glacial geology of outer Björnöyrenna, western Barents Sea: preliminary results.
Saettem, J., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.173-177, 29 refs.
Poole, D.A.R., Sejrup, H.P., Ellingsen, K.L.
Paleoclimatology, Bottom sediment, Glacial deposits, Drill core analysis, Stratigraphy, Glacial geology, Barents Sea.

46-4352
Analyses of climatological series in relation to the detection of the CO2 effect.
Coops, A.J., *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.179-182, 5 refs.
Climatic changes, Atmospheric composition, Carbon dioxide, Seasonal variations, Statistical analysis.

46-4353
Peculiarities of polar ozone annual course: analysis of satellite and ozonesonde data and model results.
Gruzdev, A.N., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.183-187, 11 refs.
Polar atmospheres, Atmospheric composition, Ozone, Seasonal variations, Stratosphere, Atmospheric circulation.
The following analysis demonstrates certain space-time structures in the annual evolution of the ozone field. Latitude-altitude features of the ozone annual cycle in different layers of the stratosphere and troposphere, in the northern and southern hemispheres (NH and SH) at middle latitudes are compared with those in polar latitudes. There are differences in principle in ozone space-time dynamics in the northern and southern polar regions, particularly in connection with stratospheric-tropospheric exchange, boundary-layer ozone, and the possible creation of ozone 'holes'. (Auth.)

46-4354
Stable ozone layer at Tromsö.
Henriksen, K., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.189-190, 4 refs.
Svenöe, T., Larsen, S.H.H.
Polar atmospheres, Atmospheric composition, Ozone, Norway.

46-4355
Global, spectral ultraviolet and visible measurements in the Arctic.
Henriksen, K., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.191-193, 5 refs.
Claes, S., Svenöe, T., Stamnes, K.
Polar atmospheres, Solar radiation, Ozone, Ultraviolet radiation.

46-4356
On the oceanic control of the global surface air temperature.
Moene, A., *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.195-197, 6 refs.
Polar atmospheres, Air water interactions, Global change, Surface temperature, Air temperature, Radiation balance.

46-4357
Exchange of CO2 between the atmosphere and the ocean.
Nydal, R., *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.199-201, 6 refs.
Polar atmospheres, Air water interactions, Atmospheric composition, Carbon dioxide, Sea water, Water chemistry.

46-4358
Correlation between observed anomalies of sea surface temperature and the sea-level pressure above Scandinavia and the north-east Atlantic.
Pedersen, K., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.203-205, 6 refs.
Kanestrøm, I.
Polar atmospheres, Air water interactions, Surface temperature, Water temperature, Atmospheric pressure.

46-4359
1987-89 total ozone and 1989 ozone sounding observations in northern Scandinavia and the temperature of the lower stratosphere during 1965-88 in Sodankylä.
Taalas, P., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.207-209, 11 refs.
Kyrö, E.
Polar atmospheres, Atmospheric composition, Ozone, Stratosphere, Air temperature.

46-4360
Ultraviolet radiation: the missing link in the ozone debate.
Webb, A.R., *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.211-213, 11 refs.
Polar atmospheres, Atmospheric composition, Ozone, Stratosphere, Ultraviolet radiation.

46-4361
Peat humification and climate history.
Nilssen, E., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.215-217, 14 refs.
Vorren, K.D.
Paleoclimatology, Peat, Soil dating, Soil chemistry, Decomposition.

46-4362
Genetic distances between geographically isolated *Pedicularis dasyantha* populations in Spitsbergen, Svalbard Archipelago, Norway. Evidence of glacial survival?.
Odasz, A.M., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.219-221, 25 refs.
Kärkkäinen, K., Muona, O., Wein, G.
Paleoclimatology, Glacier oscillation, Plant ecology, Biogeography, Vegetation patterns, Paleoecology, Acclimatization, Glaciation, Norway—Spitsbergen.

46-4363
Preliminary history of the Little Ice Age in a mountain area in SW Norway.
Selsing, L., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.223-228, 45 refs.
Paleoclimatology, Glacier oscillation, Palynology, Climatic changes, History, Vegetation patterns, Agriculture, Norway.

46-4364
Tree-rings of Scots pine *(Pinus sylvestris L.)* as indicators of past climate in central Norway.
Thun, T., *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.229-230, 5 refs.
Paleoclimatology, Phenology, Vegetation patterns, Growth, Trees (plants), Norway.

46-4365
Annual dynamics of carbon flux in the Barents Sea: preliminary results.
Wassmann, P., et al. *Norsk geologisk tidsskrift*, Oct. 1991, 71(3). Climate of the northern latitudes: past, present and future. Edited by M. Hald, et al, p.231-234, 22 refs.
Slagstad, D.
Sea ice distribution, Biomass, Ice cover effect, Marine biology, Cryobiology, Seasonal variations, Ice edge, Bottom sediment, Polar atmospheres, Barents Sea.

46-4366
Review of the processes that control snow friction.
Colbeck, S.C., *U.S. Army Cold Regions Research and Engineering Laboratory. Monograph*, Apr. 1992, M 92-02, 40p., ADA-252 362. Refs. p.37-40.
Snow physics, Plastics, Snow friction, Polymers, Sliding, Meltwater, Skis, Lubricants, Analysis (mathematics), Temperature effects, Surface roughness.
There is a long history of interest in snow friction, but it is necessary to speculate about the details of the processes. Roughness elements and contact areas must be characterized before the basic processes can be well understood. These parameters change with movement over snow and in fresh snow probably change along the length of the slider. Friction results from a mixture of processes: dry, lubricated, and possibly capillary. Dry rubbing occurs at low speeds, loads and/or temperatures and is characterized by solid-to-solid interactions requiring solid deformation. With small quantities of meltwater present, the contact area increases and there may be capillary attachments. Static charging probably occurs and may attract dirt that, even in the size range of micrometers, could complicate the processes. Slider thermal conductivity and even color are very important. Heat is generated by friction and solar radiation absorption but some is conducted away by the slider and ice particles. The remaining heat is available to generate meltwater, which acts as a lubricant. Polyethylene bases offer many advantages including low ice adhesion, high hydrophobicity, high hardness and elasticity, good machinability, and good absorption of waxes. While sliders must be designed for use over a narrow range of snow and weather conditions, polyethylene bases can be structured and waxed to broaden that range. The important processes operate not at the air temperature, but at the ski base temperature, which is highly dependent on such things as snow surface temperature, load, and speed.

46-4367
Effects of the abrasiveness of test and training site soils on parachute life.
Hogan, A.W., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, May 1992, SR 92-11, 27p., ADA-252 389, 6 refs.
Military operation, Military equipment, Abrasion, Particle size distribution, Physical properties, Desert soils, Soil analysis, Sands, Electron microscopy.
Soil samples collected at proving grounds, test sites and paratroop training areas were examined in an attempt to estimate their potential abrasive properties when in contact with parachute support lines. Portions of support lines that had been invaded by grit during strain tests were also examined to determine the properties of the particles that degraded the lines. These preliminary analyses indicate that soil particles of a size comparable to that of the individual filaments of the parachute cord infiltrate to the interior of the cord, become embedded and damage the cord. It is necessary to determine some additional soil properties, most importantly effective hardness of the individual grains, to establish a general description of performance degradation.

46-4368
Acoustically coupled ground motion under controlled conditions: trial study.
Peck, L., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Apr. 1992, SR 92-10, 15p., ADA-252 384, 6 refs.
Frozen ground physics, Sands, Acoustics, Acoustic measurement, Thermocouples, Low frequencies.
A series of ground-motion experiments was done in the Frost Effects Research Facility at CRREL in 1985 and 1986 to determine the suitability of the FERF for studies of ground motion induced by low-frequency acoustic sources. A special method of freezing the contents of a FERF test basin by circulating frigid air was effective in freezing sand to a depth of 53 cm. The reverse means of thawing the sand, exposing it to the ambient temperature air in the FERF, did not allow for expeditious warming of the sand during winter months. Acoustically coupled ground motion was measured for sand conditions of dry, unfrozen; dry, frozen, saturated, and hard frozen. Ground-motion amplitude was 30-40% lower in saturated sand than in dry, unfrozen sand. This depth-dependent reduction is attributed to reduced air permeability in the saturated sand. The amplitude of acoustically coupled ground motion in hard frozen sand (sand frozen when wet) was 80-90% lower than in dry, unfrozen sand.

46-4369
SADARM captive flight tests: 35-GHz ground-based radar system measurements.
Nagle, J.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Apr. 1992, SR 92-09, 59p., ADA-252 553, 2 refs.
Cold weather operation, Military operation, Backscattering, Analysis (mathematics), Radar echoes, Antennas, Radar.
Search and Destroy Armaments (SADARM) winter captive flight tests were conducted in Grayling, MI, from Mar. 6-19, 1990 to assess the performance of SADARM sensors flying over appropriate target sets in a winter background environment. Several target configurations were used in a variety of winter conditions, including both moving and stationary targets as well as clean and countermeasured targets and decoys. Ground-based millimeter wave radar and infrared measurements made during the testing period provided data to increase the understanding of target-background interaction. This re-

port contains the methods used to reduce and calibrate the ground-based 35-GHz radar data. Each scene imaged is described and a discussion is presented of the methods used to calculate the backscattered power and NRCS and to calibrate the radar.

46-4370
Laser depolarization from targets in a winter environment.
Koh, G., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Apr. 1992, SR 92-08, 8p., ADB-161 886, 4 refs.
Lasers, Backscattering, Mines (ordnance), Detection, Snow cover effect, Ice cover effect, Frost, Cold weather operation, Military operation.
The use of a near-infrared laser (1.06 micron wavelength) scanner for the standoff detection of surface mines is currently under consideration by the military. The concept is to rapidly scan a potential minefield with a polarized laser beam and to map the backscatter intensity and depolarization patterns from the scanned area in order to determine the presence of mines. Experiments have been conducted to investigate the potential limitations of such a system in a winter environment. Metal plates were coated with military-specified primer and paints to simulate mine surfaces, and the polarization-dependent reflectance properties of these surfaces were measured. Changes caused by the presence of frost, snow, ice and water on the reflectance properties of the simulated mine surfaces were determined. The mechanisms involved in the depolarization of the laser beam backscattered from these surfaces are discussed.

46-4371
Slow growth of ice crystals in water.
Colbeck, S.C., *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, Mar. 1992, CR 92-03, 10p., ADA-251 864, 12 refs.
Ice crystal growth, Frazil ice, Slush, Ice crystal structure.
Ice crystals were slowly grown in supercooled water at growth rates spanning those for slush to those for frazil. All of the crystals were disks with aspect ratios between 2 and 35, which increased with growth rate. The growth rates were much less than expected from theory, possibly because of crowding in the experiment. The shapes showed a gradual transition from well-rounded to highly-faceted as the growth rate increased. Even in the lower range of growth rates the crystals do not undergo metamorphism during growth, so the kinetics of crystal growth controls the shape over the entire range of growth rates investigated here. This explains why all of the crystals were disk shaped, as opposed to the well-rounded crystals seen in slush.

46-4372
U.S. Naval Support Force, Antarctica: detachment operations, 1989-1990.
Reed, M.R., et al, *Antarctic journal of the United States*, 1990, 25(5), p.295-296.
Floro, C.V.O.
Cold weather operations, Ice runways, Piers, Winter maintenance, Antarctica—McMurdo Station.
Naval Support Force, Antarctica (NSFA) carries out its mission from four locations. During the austral summer, the main body of NSFA personnel deploys to McMurdo Station. Two other detachments provide technical and logistical support for the U.S. Antarctic Program. The unit's homeport headquarters at Port Hueneme, CA, and a logistic staging area at Christchurch, New Zealand. During the winter of Operation DEEP FREEZE 1990, Detachment McMurdo upgraded several buildings, including alterations to the Officer's Club, CNSFA Headquarters, and the MARS Building. New flooring was placed in the fuels barn and the gymnasium floor was resurfaced. Outside projects included packing the snow road at Williams Field for the mid-winter airdrop, installing new approach and perimeter markers for the sea-ice runway to provide better visibility for pilots (especially during the twilight WINFLY season), and finishing temporary lighting and core sampling for the newly constructed ice pier.

46-4373
U.S. Naval Support Force, Antarctica: ship operations, 1989-1990.
Reed, M.R., *Antarctic journal of the United States*, 1990, 25(5), p.298-299.
Cold weather operations, Icebreakers, Ice navigation, Fuel transport, Logistics, Antarctica—McMurdo Station.
One U.S. Coast Guard and two civilian contract ships traveled to McMurdo Station during the 1989-1990 austral summer. The USCGC *Polar Star* (WGAB-10) provided icebreaking support; the M/V *Gus W. Darnell* transported fuel to the station and took on used fuel for return to the United States; and the M/V *Green Wave* brought supplies to the station to meet the needs of the upcoming winter and the next austral summer. Additionally, the National Science Foundation's research ship *Polar Duke* visited McMurdo Station twice during Jan. and Feb. 1990 to take on passengers, fuel, and cargo. The USCGC *Polar Sea* (WGAB-11) remained in Seattle on standby from Jan. 1 to Feb. 15.

46-4374
Arctic science, engineering, and education. Directory of awards, fiscal year—1991.
U.S. National Science Foundation, Washington, D.C., 1992, 57p.
Research projects, Organizations, Cost analysis, Legislation, Education.

46-4375
Observations of the falling motion of plate-like snow crystals. Part I: the free-fall patterns and velocity variations of unrimed crystals.
Kajikawa, M., *Meteorological Society of Japan. Journal*, Feb. 1992, 70(1), p.1-9, With Japanese summary, 25 refs.
Snowfall, Snow crystal structure, Falling snow, Velocity measurement, Snowflakes, Falling bodies.

46-4376
Three-dimensional radar echo structure of a snow band formed on the lee side of a mountain.
Fujiyoshi, Y., et al, *Meteorological Society of Japan. Journal*, Feb. 1992, 70(1), p.11-24, With Japanese summary, 22 refs.
Tsuboki, K., Satoh, S., Wakahama, G.
Snowfall, Cloud cover, Snowstorms, Radar echoes, Topographic effects, Clouds (meteorology).

46-4377
Riming proportion in snow particles falling on coastal areas.
Harimaya, T., et al, *Meteorological Society of Japan. Journal*, Feb. 1992, 70(1), p.57-65, With Japanese summary, 11 refs.
Sato, M.
Snowfall, Snow pellets, Snow crystal growth, Snow ice interface, Clouds (meteorology), Marine meteorology.

46-4378
Mesoscale cyclogenesis in winter monsoon air streams: quasi-geostrophic baroclinic instability as a mechanism of the cyclogenesis off the west coast of Hokkaido Island, Japan.
Tsuboki, K., et al, *Meteorological Society of Japan. Journal*, Feb. 1992, 70(1), p.77-93, With Japanese summary, 26 refs.
Wakahama, G.
Snowstorms, Atmospheric circulation, Marine meteorology, Atmospheric disturbances, Atmospheric pressure, Japan—Hokkaido.

46-4379
Statistical characteristics of graupel precipitation over the Japan islands.
Mizuno, H., *Meteorological Society of Japan. Journal*, Feb. 1992, 70(1), p.115-121, With Japanese summary, 37 refs.
Snowfall, Snow pellets, Precipitation (meteorology), Cloud seeding, Statistical analysis, Japan.

46-4380
Annotated bibliography on the greenhouse effect and climate change.
Handel, M.D., ed, *Climatic change*, June 1992, 21(2), p.91-255, Refs. p.223-253.
Risbey, J.S., ed.
Global warming, Atmospheric composition, Bibliographies, Air pollution.

46-4381
Arctic research of the United States, Vol.6.
U.S. Interagency Arctic Research Policy Committee, MP 3104, Washington, D.C., Spring 1992, 136p.
Myers, C.E., ed, Bowen, S., ed, Cate, D.W., ed, Valliere, D.R., ed.
Research projects, Organizations, Legislation, Cost analysis, International cooperation, Meetings.

46-4382
Snowy torrents: avalanche accidents in the United States 1972-79.
Williams, K., et al, Jackson, WY, Teton Bookshop Publishing Company, [1984], 221p., 14 refs.
Armstrong, B.
Avalanches, Accidents, Safety, Rescue operations, United States.

46-4383
Low-temperature water for heat distribution systems.
Phetteplace, G.E., MP 3105, United States Army Corps of Engineers Electrical and Mechanical Engineering Conference, Dallas, TX, July 14-17, 1992, Dallas, 1992, p.139-145, 6 refs.
Radiant heating, Water pipes, Heat transfer, Heat loss, Military facilities, Cost analysis.

46-4384
On the characteristics of eddies in the stable atmospheric boundary layer.
Rees, J.M., *Boundary-layer meteorology*, June 1991, 55(4), p.325-343, 24 refs.
Atmospheric circulation, Ice air interface, Wind (meteorology), Boundary layer, Polar atmospheres, Wave propagation, Turbulence, Atmospheric disturbances, Antarctica—Halley Station.
A discussion of the cross-spectral properties of eddies in the lowest 40 m of the nocturnal boundary layer is presented. The study involves the analysis of meteorological data collected at Halley Station during the austral winter of 1986. Cross-spectral analysis is used to determine whether the nature of the observed eddies is primarily turbulent or whether their structure is characteristic of coherent internal gravity waves. It is found that the cross-spectral phases indicate the presence of turbulent eddies only when the local gradient Richardson number (Ri) is less than the critical value of 1/4. Trapped modes were rarely observed when an offshore wind prevailed, indicating that topographic effects are responsible for their generation. The relative phases of velocity and temperature were often observed to change with height. This can be explained by examining the underlying meteorological conditions. On several occasions, regions of counter-gradient fluxes were detected. A physical explanation of this phenomenon is proposed. (Auth.)

46-4385
Refraction seismic survey of some thick till in southeast Alaska.
Washburn, D.S., Symposium on the Application of Geophysics to Engineering and Environmental Problems, Oakbrook, IL, Apr. 26-29, 1992. SAGEEP '92. Proceedings. Vol.1 (of 2 vols.). Edited by R.S. Bell. Golden, CO, Society of Engineering and Mineral Exploration Geophysicists, 1992, p.223-242.
Geophysical surveys, Glacial deposits, Seismic surveys, Seismic refraction, Exploration, Cold weather operation, Cost analysis.

46-4386
Development of arctic offshore technology.
Enkvist, E., et al, Helsinki, Technology Development Centre (TEKES), 1990, 96p., Refs. passim.
Eranti, E.
Icebreakers, Offshore structures, Economic development, Offshore drilling, Ice loads, Research projects, Test chambers, Cost analysis, Finland.

46-4387
Use of de-icing chemicals on bridge decks.
Chichak, M.F., et al, *Alberta Transportation and Utilities. Research and Development Branch. Report*, 1989, ABTR/RD/RR-89/03, 14p. + appends., 21 refs.
Filipiak, R.
Bridges, Chemical ice prevention, Road icing, Road maintenance, Salting, Cost analysis.

46-4388
Comparative testing of four bow designs for ice-breaking hull forms.
Glen, I.F., et al, *Transport Canada. Publication*, Mar. 1991, TP 10834E, 145p. + appends (2 vols.), Vol.1—Main report; Vol.2 - Appendices. 10 refs.
Menon, B., Hardiman, K.
Icebreakers, Ice breaking, Ice navigation, Ice loads, Ice solid interface, Metal ice friction, Propellers, Ice models, Test chambers, Environment simulation, Cost analysis.

46-4389
Cloud-property retrieval using merged HIRS and AVHRR data.
Baum, B.A., et al, *Journal of applied meteorology*, Apr. 1992, 31(4), p.351-369, 33 refs.
Wielicki, B.A., Minnis, P., Parker, L.
Cloud physics, Cloud height indicators, Ice crystal optics, Radiometry, Remote sensing, Radiance, Sounding, Scattering, Optical properties.

46-4390
Further comparisons of simultaneous airborne and radiometric measurements of supercooled liquid water.
Hill, G.E., *Journal of applied meteorology*, Apr. 1992, 31(4), p.397-401, 6 refs.
Atmospheric composition, Water vapor, Water content, Radiometry, Supercooling, Accuracy, Aerial surveys, Microwaves, Meteorological factors.

46-4391
Further results of Grossversuch IV: the effect of the first rocket launched into a potential hail cell.
Bader, J., et al, *Journal of applied meteorology*, July 1992, 31(7), p.700-707, 9 refs.
Stahel, W.A., Schmid, W.
Hail prevention, Weather modification, Hail clouds, Cloud seeding, Aircraft, Performance, Statistical analysis, Precipitation (meteorology).

46-4392
New primary ice-nucleation parameterizations in an explicit cloud model.
Meyers, M.P., et al, *Journal of applied meteorology*, July 1992, 31(7), p.708-721, 51 refs.
DeMott, P.J., Cotton, W.R.
Cloud physics, Ice crystal growth, Homogeneous nucleation, Condensation nuclei, Ice vapor interface, Snow pellets, Freezing nuclei, Precipitation (meteorology), Mathematical models, Topographic effects.

46-4393
Sea ice prediction: the development of a suite of sea-ice forecasting systems for the Northern Hemisphere.
Preller, R.H., *Oceanography*, 1992, 5(1), p.64-68, 13 refs.
Sea ice distribution, Ice forecasting, Ice models, Ice edge, Thermodynamics, Mathematical models, Meteorological data, Remote sensing.

46-4394
Cool thermal storage by vacuum freezing of water.
Yeh, H.M., et al, *Energy*, July 1991, 16(7), p.1045-1049, 9 refs.
Cheng, C.Y.
Ice makers, Cooling systems, Vacuum freezing, Performance, Thermal conductivity, Design, Temperature distribution, Utilities.

46-4395
Reconstruction of ice crystal surfaces at low temperatures.
Fletcher, N.H., *Philosophical magazine B*, July 1992, 66(1), p.109-115, 12 refs.
Ice physics, Ice crystal structure, Ice vapor interface, Surface structure, Molecular structure, Orientation, Low temperature research, Cloud physics, Temperature effects.

46-4396
Snow ripples and their contribution to the mass transport in drifting snow.
Kosugi, K., et al, *Boundary-layer meteorology*, Apr. 1992, 59(1-2), p.59-66, 17 refs.
Nishimura, K., Maeno, N.
Snowdrifts, Mass transfer, Blowing snow, Snow air interface, Snow morphology, Wind factors, Snow surface, Surface structure, Snow mechanics, Cold weather tests.

46-4397
Dynamical aspects of katabatic wind evolution in the antarctic coastal zone.
Gallée, H., et al, *Boundary-layer meteorology*, Apr. 1992, 59(1-2), p.141-161, 33 refs.
Schayes, G.
Wind (meteorology), Atmospheric disturbances, Turbulent boundary layer, Ice air interface, Topographic effects, Ice cover effect, Wind velocity, Slope orientation, Mathematical models, Shores.
The spatial evolution of katabatic winds along idealized slopes representative of antarctic terrain is examined, using a hydrostatic, two-dimensional primitive equation model with high resolution. A downslope momentum-forces analysis is made of simulations in which katabatic flow reaches steady state, with emphasis on physical mechanisms in the coastal zone. The importance of the reversal of the pressure gradient force in the coastal zone, causing the sudden decay of katabatic winds, is discussed. (Auth.)

46-4398
Three-dimensional large-scale cloud model: testing the role of radiative heating and ice phase processes.
Lee, J.L., et al, *Tellus*, May 1992, 44A(3), p.197-216, 41 refs.
Liou, K.N., Ou, S.C.
Cloud cover, Mass transfer, Cloud physics, Radiant heating, Water content, Ice crystal growth, Meteorological factors, Mathematical models, Precipitation (meteorology), Forecasting.

46-4399
Non-linear viscoelastic response of ice.
Morland, L.W., *Applied ocean research*, Oct. 1991, 13(5), p.254-261, 20 refs.
Ice mechanics, Ice creep, Ice deformation, Viscoelasticity, Strain tests, Stress concentration, Mathematical models, Flexural strength, Temperature effects.

46-4400
Measurements in a leading-edge separation bubble due to a simulated airfoil ice accretion.
Bragg, M.B., et al, *AIAA journal*, June 1992, 30(6), p.1462-1467, 19 refs.
Khodadoust, A., Spring, S.A.
Aircraft icing, Ice accretion, Bubbles, Ice air interface, Air flow, Performance, Simulation, Laminar flow, Turbulent boundary layer, Glaze, Surface roughness.

46-4401
Molecular dynamics study of freezing in a confined geometry.
Ma, W.J., et al, *Journal of chemical physics*, July 1, 1992, 97(1), p.485-493, 23 refs.
Banavar, J.R., Koplik, J.
Freezing, Phase transformations, Liquid cooling, Frozen liquids, Liquid solid interfaces, Layers, Computerized simulation, Physical properties.

46-4402
Determination of the D2O ice VII-VIII transition line by Raman scattering up to 51 GPa.
Pruzan, P., et al, *Journal of chemical physics*, July 1, 1992, 97(1), p.718-721, 23 refs.
Chervin, J.C., Canny, B.
Ice physics, Deuterium oxide ice, Phase transformations, High pressure ice, Stability, Ice spectroscopy, Molecular structure, Temperature effects, Low temperature research, Scattering.

46-4403
Treatment of rigid bodies by diffusion Monte Carlo: application to the para-H2...H2O and ortho-H2...H2O clusters.
Buch, V., *Journal of chemical physics*, July 1, 1992, 97(1), p.726-729, 10 refs.
Molecular energy levels, Water structure, Ice physics, Hydrogen bonds, Adsorption, Analysis (mathematics), Orientation.

46-4404
Proceedings of the NIPR Symposium on Polar Meteorology and Glaciology, No.5.
Kawaguchi, S., ed, Tokyo, National Institute of Polar Research, 1992, 194p., Refs. passim. For individual papers see F-46555, F-46556, F-46558 through F-46563, I-46547 through I-46554, I-46557, I-46564, I-46565 or 46-4405 through 46-4416.
NIPR Symposium on Polar Meteorology and Glaciology, 13th, Tokyo, July 12-13, 1990.
Snow, Meetings, Ozone, Atmospheric circulation, Sea ice, Ice cores, Engineering, Polar regions.
This is a collection of papers presented at the 13th Symposium on Polar Meteorology and Glaciology held on July 12-13, 1990, in Tokyo. It consists of 19 full length papers and 15 abstracts; the former are arranged in areas of meteorology, physical oceanography and glaciology. They include studies of atmospheric constituents, ozone, sea ice and physical oceanography, atmospheric circulation and climate, ice sheet and snow cover, ice core, snow and ice crystals, meteorological and glaciological observations, remote sensing, instrumentation and polar region engineering, as part of the research programs of the Antarctic Climate Research, 1987-1991, East Queen Maud Land Glaciological Project, 1982-1986, and Middle Atmosphere Program, 1982-1985.

46-4405
Cloud-radiative forcing over the snow-covered surface around Asuka Station, Antarctica.
Aoki, T., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1992, p.76-89, 13 refs.
Yamanouchi, T.
Clouds (meteorology), Radiation, Albedo, Snow cover effect, Polar regions, Antarctica--Asuka Station.
Cloud-radiative forcing at the snow-covered surface in Antarctica was estimated from data of the radiation budget observation at Asuka Station in 1988. Cloud-radiative forcing at the top of the atmosphere was also estimated from satellite data in Dec. 1988. It was found that shortwave forcing was negative (cooling) at the surface and positive (heating) at the top of the atmosphere. The longwave forcing was positive both at the surface and at the top of the atmosphere. The (shortwave + longwave) forcing was positive both at the surface and at the top of the atmosphere. The shortwave forcing was positive over the snow-covered region except the high inland, and negative over the seas. The longwave forcing was positive over all regions. The (shortwave + longwave) forcing was positive over the snow-covered regions except the high inland plateau, and negative over the sea. (Auth. mod.)

46-4406
Annual variation of snowfall and radar echo structure of snow clouds at Syowa Station, Antarctica.
Konishi, H., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1992, p.90-96, 8 refs.
Snowfall, Clouds (meteorology), Radar echoes, Measuring instruments, Antarctica--Showa Station.
Snow clouds were observed with vertical pointing radar at Showa Station from Feb. 1988 to Dec. 1989. In order to find the *Z-R* relationship, the snowfall rate was directly measured by using an electric balance at the ground. The annual amount of snowfall was estimated to be 400 mm in 1989. The amount of snowfall was 120 mm in spring, 170 mm in the fall, and 70 mm in winter. It was less than 20 mm in summer. Two types of clouds appeared above Showa Station: one had a low cloud top (less than 2 km) and the other had a higher cloud top. The former clouds occurred predominantly in winter and the latter in spring and fall. The higher type clouds are related to the warm front of a low pressure system. The activity of lower type clouds is related to the temperature and humidity in the clouds. These conditions may be connected with the area of sea ice. (Auth.)

46-4407
***Z-R* relation for graupels and aggregates observed at Syowa Station, Antarctica.**
Konishi, H., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1992, p.97-103, 11 refs.
Snowfall, Snow pellets, Velocity measurement, Aggregates, Snowflakes, Antarctica--Showa Station.
The radar reflectivity factor *Z* and the snowfall rate *R* were measured by a vertical pointing radar and a high sensitivity snow gauge, respectively. From these data, a best fit *Z-R* relation for three snowfall events was found. The diameter and fall velocity of snow particles were also measured at the radar site by using a video camera and an image processor. The types of snow particles described in this paper are aggregates and graupel-like particles, which account for much of snowfall in Antarctica. The range of snowfall rate is similar in all three cases, while the radar reflectivity factor is much different. For the same radar reflectivity factor, the snowfall rate of graupel-like particles was about seven times as large as that for aggregates. (Auth.)

46-4408
Open water and circumpolar trough in the Antarctic.
Enomoto, H., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1992, p.104-112, 28 refs.
Ohmura, A.
Sea ice distribution, Polynyas, Climatic factors, Air ice water interaction, Antarctica--Weddell Sea.
The extent of open water area in spring and the time of rapid retreat of the sea ice area in late spring are important characteristics of sea ice in the Antarctic. The present study investigates relationships between atmospheric conditions and open water extent. In this study, the position and intensity of the circumpolar trough are used as a measure of atmospheric conditions over the sea ice. When the circumpolar trough is intense, it tends to be located at higher latitudes along the antarctic coast. In such cases, the open water in spring increases and the time of significant retreat of the sea ice edge in late spring tends to be delayed. (Auth.)

46-4409
Determination of hydrogen peroxide in snow: preliminary results for snow samples in the inland region, Antarctica.
Kamiyama, K., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1992, p.113-119, 15 refs.
Nakayama, E.
Snow composition, Measuring instruments, Atmospheric composition.
Hydrogen peroxide (H2O2) in snow possibly marks annual layers of snow deposition as well as the atmospheric environments where it is created. Methods for the determination of H2O2 in snow and its suitability for field observation are discussed. The vertical plate of a surface snow block obtained on the inland high plateau in Antarctica was analyzed to precisely determine H2O2 distribution. Relatively high concentrations of H2O2 were detected, suggesting seasonal fluctuation. Laminated snow layers of glaciers record past depositional environments. Sufficiently fine sampling intervals of snow, both horizontally (geographically) and vertically, are important to make clear the depositional environments over the glaciers. (Auth. mod.)

46-4410
Distribution of mean delta 0-18 values of surface snow layers and their dependence on air temperature in Enderby Land—East Queen Maud Land, Antarctica.
Satow, K., et al, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1992, p.120-127, 16 refs.
Watanabe, O.
Climatic factors, Snow composition, Snow surface temperature, Snow air interface, Antarctica—Enderby Land, Antarctica—Queen Maud Land.
Oxygen isotope analyses of surface snow layers have been carried out in Enderby Land and Queen Maud Land. The delta O-18 values decrease with various parameters, including elevation, distance from the coast, and in particular with mean annual surface temperatures, according to a good linear relationship in the temperature range from -20 to -55 C. The relationship with temperature is similar to that derived from a simple model in which an air mass is progressively cooled under Rayleigh conditions as it moves toward the inland plateau. This also suggests that delta O-18 values are closely related to condensation temperature at the top of the inversion layer where snow precipitation is formed. (Auth.)

46-4411
Bare ice fields developed in the inland part of Antarctica.
Takahashi, S., et al. NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1992, p.128-139, 11 refs.
Endoh, T., Azuma, N., Meshida, S.
Ice sublimation, Climatic factors, Ice surface, Snow accumulation, Mass balance, Antarctica—Sör Rondane Mountains.
Observations of a bare ice field were carried out at Seal Rock in the Sör Rondane area. A large sublimation rate, 200 to 280 mm/a, was observed on the bare ice field. Air temperature on the bare ice was about 1 C higher than that on the snow surface. The large sublimation rate was explained by the low albedo of bare ice; its value was roughly estimated from heat budget considerations. The bare ice fields were classified into 4 types according to origin. (Auth.)

46-4412
Distribution of surface conditions of ice sheet in Enderby Land and East Queen Maud Land, East Antarctica.
Furukawa, T., et al. NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1992, p.140-144, 9 refs.
Watanabe, O., Seko, K., Fujii, Y.
Ice surface, Snow surface, Ice sheets, Antarctica—Enderby Land, Antarctica—Queen Maud Land.
Data on surface features collected by the Japanese Antarctic Research Expedition (JARE) along traverse routes were compiled to understand their aerial distribution in Enderby Land and East Queen Maud Land. This area can be divided into three regions on the basis of the regional characteristics of surface features. The results will be useful for deducing the aerial distribution of surface features from satellite images. (Auth.)

46-4413
Air bubble formation process observed in the G6 antarctic ice core.
Mitani, A., et al. NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1992, p.145-149, 5 refs.
Shoji, H., Fujii, Y.
Ice cores, Bubbles, Paleoclimatology, Ice dating, Ice density.
Air bubble formation processes were investigated on a 100 m-long ice core from G6, Antarctica. The observational results revealed clearly the five-stage process of air bubble entrapment. The pore space was closed off at a depth of 72 m, which yields about a 470 year age difference between air bubbles and the ice, estimated under an assumption of 9 cm of ice/year as the accumulation rate. (Auth.)

46-4414
Ice layer observations in the G6 antarctic ice core.
Shoji, H., et al. NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1992, p.150-155, 4 refs.
Murata, K., Fujii, Y.
Ice cores, Layers, Paleoclimatology.
Ice crust layer studies were carried out on a 100 m-long ice core from G6, Antarctica. Light table observations were conducted to measure the depth, thickness, orientation and shape of each ice layer. The results were analyzed for the depth variations to obtain information on past ice sheet surface conditions. No indication was obtained of any distinctive change in snow surface conditions for the last several hundred years at the G6 site. (Auth.)

46-4415
Analysis of MOS-1 MSR data received at Syowa Station, Antarctica.
Yamanouchi, T., et al. NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1992, p.156-166, 14 refs.
Oshiyama, T., Wada, M.
Brightness, Sea ice, Water content, Water vapor, *Meteorological instruments, Data processing, Spacecraft,* Antarctica—Showa Station.
Atmospheric parameters and ground surface information are obtained using the MOS-1 MSR data received at Showa Station. Several difficulties have appeared in the process of deriving water vapor amount and liquid water content. One is the antenna temperature, which includes large bias error; this causes the largest uncertainty. Also, the antenna temperature near the coast of the antarctic continent was greatly affected by high brightness temperature of the ice sheet owing to the antenna side lobe, which caused difficulties in comparing with ground-based observations as a validation. In the normal condition, for the present example, water vapor amount ranged from 0.4 to 1.4 g/sq cm and liquid water content from 0 to 14 mg/sq cm. However, there was found a band of high liquid water content in some paths, corresponding to a high brightness temperature of about 190 K. Atmospheric water vapor or liquid water affects the estimation of surface conditions such as sea ice concentration. It is difficult to obtain atmospheric parameters over the ice sheet and sea ice, on account of their high and variable brightness temperature. (Auth.)

46-4416
Preliminary study of katabatic wind by using NOAA AVHRR data.
Seko, K., NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.5, Tokyo, National Institute of Polar Research, 1992, p.167-173, 14 refs.
Spaceborne photography, Photointerpretation, Radiometry, Wind (meteorology), Ice sheets, Antarctica—Showa Station.
The behavior of katabatic winds on the antarctic ice sheet can be monitored from NOAA AVHRR data. Katabatic wind is observed as fluctuations of brightness temperature on the thermal infrared channel. The structure of the fluctuation reveals a well-defined streak feature. Wind direction and wind speed can be monitored from the satellite images. The fluctuation of brightness temperature is probably caused by fluctuation in wind velocity. (Auth.)

46-4417
Comparison of four cold hardiness tests on three western conifers.
Burr, K.E., et al. Western Forest Nursery Council Meeting, Tumwater, WA, Aug. 12-15, 1986. Fort Collins, CO, U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station, 1986, p.87-95, 26 refs.
Tinus, R.W., Wallner, S.J., King, R.M.
Cold tolerance, Plant physiology, Acclimatization, Plant ecology, Plant tissues, Trees (plants), Frost resistance, Growth.

46-4418
Evaluation of snowmelt lysimeters in an Arizona mixed conifer stand.
Gottfried, G.J., et al. *Hydrology and water resources in Arizona and the Southwest,* 1980, Vol.10, p.221-229, 7 refs.
Ffolliott, P.F.
Snowmelt, Runoff, Snow samplers, Forest strips, Snow hydrology, Seepage.

46-4419
Future climate in the Nordic region; survey and synthesis for the next century.
Alexandersson, H., et al. Swedish Meteorological and Hydrological Institute. Reports. Meteorology and climatology, 1992, SMHI RMK, No.64, 46p., With Swedish summary. 44 refs.
Dahlström, B.
Global warming, Climatic changes, Polar atmospheres, Air ice water interaction.

46-4420
Performance degradation of helicopters due to icing—a review.
Korkan, K.D., et al. 41st annual forum and technology display, Fort Worth, TX, May 15-17, 1985. Alexandria, VA, American Helicopter Society, 1985, 21p., 52 refs. For another version see 40-4184.
Dadone, L., Shaw, R.J.
Aircraft icing, Helicopters, Cold weather performance.

46-4421
Performance of ice-strengthened ships in the northern Baltic Sea in winter 1991.
Kujala, P., et al. *Helsinki University of Technology. Laboratory of Naval Architecture and Marine Engineering. Report,* 1992, M-117, 80p. + appends., 8 refs.
Sundell, T.
Ice navigation, Ships, Metal ice friction, Ice breaking, Ice conditions, Ice solid interface, Baltic Sea.

46-4422
Factors affecting frost susceptibility and heaving pressure in soils.
Kujala, K., *Acta Universitatis Ouluensis. Series C, Technica,* 1991, Vol.C58, 99p. + appends., Refs. p.92-99.
Soil freezing, Frost heave, Frost resistance, Soil strength, Soil pressure, Unfrozen water content, Mathematical models.

46-4423
Sharing knowledge, sharing resources: a plan for a Canadian Polar Information System.
Minion, R., et al. Calgary, Alberta, Arctic Institute of North America, 1991, 47p., 25 refs.
Goodwin, R.
Research projects, Organizations, Cost analysis, Data processing, Canada.

46-4424
Theories of competitive cloud droplet growth and their application to cloud physics studies.
Fukuta, N., *Journal of the atmospheric sciences,* July 1, 1992, 49(13), p.1107-1114, 16 refs.
Cloud droplets, Cloud physics, Supersaturation, Condensation, Analysis (mathematics).

46-4425
Residual circulations calculated from satellite data: their relations to observed temperature and ozone distributions.
Geller, M.A., et al. *Journal of the atmospheric sciences,* July 1, 1992, 49(13), p.1127-1137, 20 refs.
Nash, E.R., Wu, M.F., Rosenfield, J.E.
Atmospheric circulation, Ozone, Polar atmospheres, Atmospheric composition, Air temperature, Temperature distribution, Statistical analysis.
Monthly mean residual circulations were calculated from eight years of satellite data. The diabatic circulation is usually found to give a good approximation to the residual circulation, but this is not always the case. In particular, an example is shown at 60S and 30 mb where the diabatic and residual circulations show very different annual variations. Correlations between the vertical component of the residual circulation and temperature and ozone indicate that yearly variations of temperatures at higher latitudes are under radiative control, except during stratospheric warmings. A one to two month phase lag is seen in the annual variation in the total ozone at 60N with respect to the maximum downward residual motions. This phase lag is greater at 60N than at 60S. There is evidence at 60S of a greater downward trend in the mean zonal ozone maxima than there is in the minima. A decreasing trend in the maximum descending motion is seen to accompany the ozone trend at 60S. (Auth. mod.)

46-4426
Quaternary geology of western and central North Greenland.
Kelly, M., et al. *Denmark. Grönlands geologiske undersögelse. Rapport,* 1992, No.153, 34p., With Danish and Inuit summaries. 63 refs.
Bennike, O.
Geological surveys, Quaternary deposits, Glacial geology, Marine deposits, Glacial deposits, Stratigraphy, Geochronology, Glaciation, Fossils, Greenland.

46-4427
Forecasting heavy snow events in Missoula, Montana.
Richmond, M., *U.S. National Oceanic and Atmospheric Administration. National Weather Service. Western Region. NOAA technical memorandum.* May 1992, NWS WR-217, 6p. + appends., 4 refs.
Snowstorms, Weather forecasting, United States—Montana.

46-4428
Taku Glacier.
Motyka, R.J., et al. *Alaska. Division of Geological and Geophysical Surveys. Information circular,* [1990], No.34, n.p., 5 refs.
Trabant, D.C., Noll, R.S., Post, A.
Glacier surveys, Glacier oscillation, Glacier alimentation, Calving, United States—Alaska—Taku Glacier.

46-4429
Infiltration into frozen soil as affected by ripping.
Pikul, J.L., Jr., et al. *American Society of Agricultural Engineers. Transactions,* Jan.-Feb. 1992, 35(1), p.83-90, 20 refs.
Zuzel, J.F., Wilkins, D.E.
Agriculture, Frozen ground physics, Soil tests, Mechanical tests, Seepage, Runoff, Countermeasures, Permeability, Porosity, Flow measurement.

46-4430
Ice floe identification in satellite images using mathematical morphology and clustering about principal curves.
Banfield, J.D., et al. *American Statistical Association. Journal,* Mar. 1992, 87(417), p.7-16, 31 refs. For another version see 44-1599.
Raftery, A.E.
Sea ice, Ice floes, Remote sensing, Detection, Ice edge, Image processing, Statistical analysis, Ice navigation.

46-4431
Polaris update.
Keen, A.J., *CIM bulletin,* June 1992, 85(961), p.51-57, 3 refs.
Mining, Cold weather operation, Underground facilities, Design, Permafrost beneath structures, Permafrost preservation, Metals.

46-4432
Modernizing and retrofitting ice skating rinks.
Blades, R.W., *ASHRAE journal,* Apr. 1992, 34(4), p.34-42, 7 refs.
Buildings, Indoor climates, Refrigeration, Ice makers, Design, Cost analysis, Maintenance, Heat sources, Ice air interface, Air temperature.

46-4433
Age-related differences in frost sensitivity of the photosynthetic apparatus of two *Plagiomnium* species.
Rütten, D., et al, *Planta*, May 1992, 187(2), p.224-229, 31 refs.
Santarius, K.A.
Mosses, Damage, Plant tissues, Freeze thaw tests, Cold stress, Frost resistance, Photosynthesis, Cold weather tests, Chlorophyll, Temperature effects.

46-4434
Zero-discharge direct-contact freezing/solar evaporator desalination complex.
Madani, A.A., *Desalination*, Feb. 1992, 85(2), p.179-195, 29 refs.
Water treatment, Design, Desalting, Sea water freezing, Slush, Environmental impact, Thermodynamics, Brines, Water supply, Ice water interface.

46-4435
Aircraft icing handbook.
Heinrich, A.M., et al, *U.S. Federal Aviation Administration. Technical Center. Technical report*, Mar. 1991, DOT/FAA/CT-88/8, Var. p. (3 vols.), ADA-238 039 through ADA-238 041, Refs. passim.
Aircraft icing, Ice accretion, Ice detection, Ice removal, Ice prevention, Safety, Environment simulation, Cold weather performance, Standards, Mathematical models.

46-4436
Hydrology: an introduction to hydrologic science.
Bras, R.L., Reading, MA, Addison-Wesley Publishing Company, 1990, 643p. (Pertinent p.247-281), Refs. passim.
Hydrology, Snowmelt, Snow hydrology, Snow accumulation, Snow cover, Hydrologic cycle.

46-4437
White death: a review of fatal avalanche accidents in Colorado, 1950-1991.
Atkins, D., *Avalanche review*, Nov. 1991, 10(1), p.1,7,8.
Avalanches, Accidents, United States—Colorado.

46-4438
Avalanche control in Heather Canyon.
Patton, C., *Avalanche review*, Dec. 1991, 10(2), p.1,4,5.
Avalanche triggering, Safety, Blasting.

46-4439
Width of unconfined slab avalanches.
Jamieson, B., et al, *Avalanche review*, Dec. 1991, 10(2), p.3,6.
Johnston, C.D.
Avalanche formation, Snow cover stability, Avalanche mechanics.

46-4440
Subcritical crack growth, initiation, and arrest in columnar freshwater and sea ice.
Parsons, B.L., St. John's, Memorial University of Newfoundland, 1989, 205p., Ph.D. thesis. Refs. p.160-183.
Ice cracks, Ice strength, Ice loads, Ice creep, Ice deformation, Crack propagation, Mathematical models.

46-4441
Aspects of frost susceptibility of granular soils.
Tester, R.E.B., Kingston, Ontario, Queen's University, 1990, 401p. (2 vols.), Ph.D. thesis. 88 refs.
Soil freezing, Soil strength, Frost resistance, Frost heave, Thaw weakening, Fines, Freeze thaw tests, Soil tests, Mathematical models.

46-4442
State of Canada's environment.
Canada. Public Advisory Committee on the State of the Environment Reporting, Ottawa, Environment Canada, 1991, Var. p., Refs. passim.
Environmental impact, Air pollution, Water pollution, Economic development, Environmental protection, Ecosystems, Natural resources, Waste treatment, Water treatment, Climatic changes, Ozone, Canada.

46-4443
U.S. research in ice mechanics: 1987-1990.
Richter-Menge, J.A., *Cold regions science and technology*, June 1992, 20(3), MP 3106, p.231-246, Refs. p.242-246.
Ice mechanics, Sea ice, Research projects, Bibliographies, Ice solid interface, Ice models, Mechanical properties, Microstructure, Mechanical tests.
This compilation of U.S. ice mechanics investigations over 1987-1990 focuses on efforts that support the development of an understanding of sea ice interaction. Both ice-structure and ice-ice interaction studies have been included in hopes that insights from one area will complement developments in the other. The work discussed in the area of ice-structure interaction was intentionally limited to lateral movement of the ice against a vertical structure. It is these results that can be most easily extended to ice-ice interaction events.

46-4444
Mathematical model for the prediction of temperature in a dry snow layer.
McComb, T.J.L., et al, *Cold regions science and technology*, June 1992, 20(3), p.247-259, 29 refs.
Snow surface temperature, Diurnal variations, Snow physics, Forecasting, Radiation balance, Meteorological factors, Thermal analysis, Layers, Mathematical models, Snow thermal properties.

46-4445
Performance of a thermosyphon with a 37 meter-long, horizontal evaporator.
Haynes, F.D., et al, *Cold regions science and technology*, June 1992, 20(3), MP 3107, p.261-269, 12 refs.
Zarling, J.P., Gooch, G.E.
Permafrost preservation, Temperature control, Pipes (tubes), Refrigeration, Simulation, Permafrost heat transfer, Thermal conductivity, Cold weather performance, Soil stabilization, Design, Ice growth, Heat sinks.
Laboratory tests were conducted on a thermosyphon with a 37 m long horizontal evaporator. This evaporator section was placed in a water tank so that the rate of ice growth on it could be determined. Unit conductance values were calculated for wind speeds of 0 to 5.4 m/s applied to the condenser section. Use of these conductance values in a finite element analysis indicated that thermosyphons with horizontal evaporators and condensate return devices were adequate for many foundation designs in permafrost regions.

46-4446
Seafloor temperature and conductivity data from Stefansson Sound, Alaska.
Sellmann, P.V., et al, *Cold regions science and technology*, June 1992, 20(3), MP 3108, p.271-288, 11 refs.
Delaney, A.J., Chamberlain, E.J., Dunton, K.H.
Ocean bottom, Liquid solid interfaces, Bottom sediment, Freezing points, Water temperature, Salinity, Temperature measurement, Electrical resistivity, Subsurface investigations, Soil compaction, Seasonal variations.
Overconsolidated sediments, seasonal seafloor freezing, and ice-bonded permafrost, unique features in shallow arctic coastal waters, are related to low seawater temperatures and varying salinities. Seabed temperatures can be less than - 1.0 C for much of the year, with noticeable warming occurring only during the summer months. Observations from recent deployment of three instruments in Stefansson Sound and data from an earlier deployment, which included sites in Harrison Bay, showed decreasing mean annual seafloor temperatures with increasing water depth, ranging from -0.9 C in 4.4 m of water to -1.6 C in 14 m of water. Salinities also varied seasonally, with noticeable freshening developing during the summer and high uniform values occurring during the winter. Periodic temperature and salinity measurements at sites in Stefansson Sound, made during Aug. 1987 and Aug. 1989, also helped verify the data obtained with the seabottom instruments. Seasonal freezing of the seabed can begin in late September and may noticeably change its engineering properties. In areas of coarse-grained sediments, ice bonding and strengthening of the seabed can result. In areas of fine-grained sediments it appears that seasonal freezing of the seafloor can cause overconsolidation of the seabed sediments. This densification process can result in a significant permanent increase in strength.

46-4447
***Travelling flexural waves in the Erebus Glacier* Tongue, McMurdo Sound, Antarctica.**
Robinson, W.H., et al, *Cold regions science and technology*, June 1992, 20(3), p.289-293, 20 refs.
Haskell, T.G.
Glacier tongues, Strain tests, Calving, Oscillations, Wave propagation, Ocean waves, Ice water interface, Ice mechanics, Gravity, Antarctica—McMurdo Sound.
The Erebus Glacier Tongue in McMurdo Sound has been the subject of numerous theoretical and experimental investigations which have assumed that the observed alternating strains are standing waves. Since Nov. 1984 the strain of the Erebus Glacier Tongue has been monitored with two strain meters placed on either side of the Tongue, and more recently with strain meters along the Tongue. These data imply that flexural-gravity waves are travelling from the snout with a phase speed of 70 +/- 10 m/s and a wavelength of 3.5 +/- 0.5 km. It is suggested that these waves are generated by surface gravity waves or seiches which, when resolved along the Tongue, produce waves travelling near the minimum phase speed for flexural-gravity waves. These observations do not support standing wave theories for the calving of glacier tongues, but suggest that the calving of the Erebus Glacier Tongue on Mar. 1, 1990 occurred when sea waves produced a large lateral force on the Tongue while it was exposed to open water. (Auth. mod.)

46-4448
Structure and strength of first-year ice ridges in the Baltic Sea.
Leppäranta, M., et al, *Cold regions science and technology*, June 1992, 20(3), p.295-311, 31 refs.
Hakala, R.
Sea ice, Ice cover thickness, Pressure ridges, Ice structure, Ice strength, Ice surveys, Physical properties, Research projects, Ice navigation.

46-4449
Snowmelt among the western Tianshan Mountains in China.
Liu, Z.C., et al, *Cold regions science and technology*, June 1992, 20(3), p.313-314, 2 refs.
Sun, L., Cai, G.T.
Snowmelt, Snow surveys, Mountains, Radiation absorption, Snow thermal properties, Albedo, Snow cover stability, Forecasting.

46-4450
On the constitutive modeling of transient creep in polycrystalline ice: reply to the comments of M. Aubertin.
Wu, M.S., et al, *Cold regions science and technology*, June 1992, 20(3), p.315-319, 15 refs. For article under discussion see 46-2810.
Shyam Sunder, S.
Ice crystals, Ice models, Ice creep, Ice mechanics, Ice relaxation, Ice elasticity, Rheology, Mathematical models.

46-4451
Preconcentration method for electrothermal atomic absorption spectrometric analysis for heavy metals in antarctic snow at sub ng/kg levels.
Suttie, E.D., et al, *Analytica chimica acta*, Mar. 20, 1992, 258(2), p.229-236, 17 refs.
Wolff, E.W.
Snow composition, Chemical analysis.
An improved technique for concentrating heavy metals onto the surface of tungsten wires, prior to analysis by electrothermal atomic absorption spectrometry, is reported. Ultraclean methods and materials described here have enabled improvements in detection limits to be realized. With the new procedure, detection limits of 0.01 ng Cd/kg, 0.47 ng Cu/kg, 0.22 ng Pb/kg and 0.24 ng Zn/kg are obtained. These are low enough to allow analysis of ancient and modern antarctic snow, except perhaps for cadmium. A comparison with samples injected directly into the graphite furnace shows good agreement, confirming that the method is suitable for the simple polar snow matrix. (Auth.)

46-4452
Satellite measurements of surface water temperature in the Great Lakes: Great Lakes CoastWatch.
Schwab, D.J., et al, *Journal of great lakes research*, 1992, 18(2), p.247-258, 22 refs.
Leshkevich, G.A., Muhr, G.C.
Spaceborne photography, Temperature measurement, Radiometry, Lake water, Surface temperature, Water temperature, Lake ice, Ice detection, Image processing, Mapping.

46-4453
Kara Sea provides shortcut. *Offshore engineer*, Mar. 1992, p.38-39.
Natural gas, Gas pipelines, Underground pipelines, Offshore structures, Cold weather operation, Ice scoring, Protection, Design, Subsea permafrost.

46-4454
Effect of an arctic polynya in the northern hemisphere mean circulation and eddy regime: a numerical experiment.
Glowienka-Hense, R., et al, *Climate dynamics*, Apr. 1992, 7(3), p.155-163, 25 refs.
Hense, A.
Polynyas, Climatic factors, Sea ice, Ocean currents, Atmospheric circulation, Air ice water interaction, Heat flux, Simulation, Global warming, Heating.

46-4455
Bases for northern field research in the 1990s.
Adams, W.P., *Information north*, June 1992, 18(2), p.5-7, 6 refs.
Research projects, Monitors, Stations, Cold weather operation, Distribution.

46-4456
Investigation of the anisotropy of the electrical characteristics of sea ice by means of radar sounding of the surface from an aircraft.
Finkel'shtein, M.I., et al, *Soviet journal of communications technology & electronics*, Mar. 1992, 37(2), p.54-58, Translated from Radiotekhnika i ekektronika, 1991, No.8. 11 refs.
Dan'shin, P.D., Peshkov, A.N.
Sea ice, Sounding, Radar echoes, Anisotropy, Ice electrical properties, Ice cover thickness, Ice bottom surface, Polarization (waves), Airborne radar.

46-4457
Abnormally warm winters 1988/89 and 1989/90 over the U.S.S.R.
Vasil'ev, A.A., et al, *Soviet meteorology and hydrology*, 1991, No.3, p.8-15. Translated from Meteorologiia i gidrologiia. 8 refs.
Ped', D.A., Chistiakova, E.A.
Winter, Air temperature, Periodic variations, Climatic changes, Atmospheric circulation, Synoptic meteorology, Air water interactions, Heating.

46-4458
Results of hydrological investigations in the Yamal rivers from remote observational data.
Borodulin, V.V., et al, *Soviet meteorology and hydrology*, 1991, No.3, p.70-76, Translated from Meteorologiia i gidrologiia. 7 refs.
Griaseva, L.I.
River flow, River ice, Ice jams, Ice conditions, Aerial surveys, Ice surveys, Floodplains, Ice floes, Velocity measurement.

46-4459
Grain growth in ice.
Nasello, O.B., et al, *Materials science forum*, 1992, Vol 94-96(Pt.2), International Conference on Grain Growth in Polycrystalline Materials, 1st, Rome, Italy, June 18-21, 1991, Proceedings. Edited by G. Abbruzzese et al, p.779-784, 16 refs.
Arena, L.E., Di Prinzio, C.A.
Ice microstructure, Ice sampling, Ice crystal growth, Ice physics, Grain size, Surface energy, Ice crystal structure, Computerized simulation, Anisotropy.

46-4460
Origin of July antarctic precipitation and its influence on deuterium content: a GCM analysis.
Koster, R.D., et al, *Climate dynamics*, June 1992, 7(4), p.195-203, 27 refs.
Jouzel, J., Suozzo, R.J., Russell, G.L.
Polar atmospheres, Precipitation (meteorology), Atmospheric circulation, Water transport, Isotope analysis, Snow impurities, Climatic factors, Heavy water, Models, Origin.
The NASA/GISS GCM (general circulation model) is used to estimate the evaporative contributions of several oceanic regions (defined by temperature) to Antarctica's July precipitation. Tracer diagnostics in the GCM suggest that the weighted average evaporative source temperature for antarctic precipitation as a whole is about 12 C. The average source temperature for local precipitation there varies from 9 C to 14 C. To examine the effect of evaporative source on water isotope concentration, the GCM also follows a global deuterium (HDO) tracer and deuterium tracers evaporating from each oceanic region. The results suggest that although evaporative source temperature does affect the concentrations of the individual HDO tracers, differences in evaporative source do not explain the scatter in the roughly linear relationship between condensation temperature and isotope concentration. (Auth. mod.)

46-4461
Small ice cap instability in seasonal energy balance models.
Huang, J., et al, *Climate dynamics*, June 1992, 7(4), p.205-215, 16 refs.
Bowman, K.P.
Ice sheets, Glacier oscillation, Glacier heat balance, Ice models, Climatic changes, Albedo, Stability.
Results from a two-dimensional energy balance model with a realistic land-ocean distribution show that a small ice cap instability exists in the Southern Hemisphere, but not in the Northern Hemisphere. A series of experiments using a one-dimensional energy balance model with idealized geography are used to study the roles of the seasonal cycle and the land-ocean distribution. The results indicate that the seasonal cycle and land-ocean distribution can influence the strength of the albedo feedback, which is responsible for the small ice cap instability, through two factors: the temperature gradient and the amplitude of the seasonal cycle. The land-ocean distribution in the Southern Hemisphere favors the small ice cap instability, while the land-ocean distribution in the Northern Hemisphere does not. Because of the longitudinal variations of land-ocean distribution in the Northern Hemisphere, the behavior of ice lines in the Northern Hemisphere cannot be simulated and explained by a model with zonally symmetric land-ocean distribution. Model results suggest that the small ice cap instability may be a possible mechanism for the formation of the antarctic icesheet. The model results cast doubt, however, on the role of small ice cap instability in Northern Hemisphere glaciations. (Auth.)

46-4462
Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions residues.
Racine, C.H., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report*, May 1992, CR 92-05, 37p., ADA-252 646, 35 refs.
Walsh, M.E., Collins, C.M., Calkins, D.J., Roebuck, B.D., Reitsma, L.
Military operation, Environmental impact, Animals, Physiological effects.
The death of hundreds of migrating dabbling ducks and 10-50 swans has been documented annually for the last ten years in Eagle River Flats (ERF), an estuarine salt marsh on Ft. Richardson, AK. This marsh has been used for the past 40 years as an artillery impact range by the U.S. Army. During May and Aug. 1990, CRREL collected 250 sediment and water samples and analyzed them for munitions residues. The authors found 2,4-DNT in a limited area of Eagle River Flats not used by waterfowl, and white phosphorus in sediments from the bottom of shallow ponds where waterfowl feed. Tissues from waterfowl observed to die or found dead in the salt marsh were collected, and white phosphorus was found in the gizzards of all 11 carcasses collected in Eagle River Flats. Adult mallards dosed in the laboratory with white phosphorus showed identical behavioral symptoms to those of wild ducks observed to become sick and die in Eagle River Flats. All evidence indicates that white phosphorus, as a particulate in the sediments, is responsible for the death of waterfowl in Eagle River Flats. Since the bottom sediments of the shallow salt marsh ponds are anaerobic, the white phosphorus particles will persist in the sediments indefinitely and remain a threat to waterfowl.

46-4463
International state-of-the-art colloquium on low-temperature asphalt pavement cracking.
Scherocman, J.A., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, Feb. 1991, SR 91-05, 50p., ADA-233 663, 45 refs.
Bitumens, Low temperature research, Cold weather performance, Pavements, Cracking (fracturing), Bituminous concretes, Bibliographies.
The International State-of-the-Art Colloquium on Low-Temperature Asphalt Pavement Cracking was held in Hanover, NH, on May 6-8, 1987. The objective was to review and summarize the existing knowledge of the causes of low-temperature transverse cracking of asphalt concrete pavement. Discussion also suggested directions for future research needed to more fully understand the mechanisms of low-temperature cracking. Overlays were not discussed.

46-4464
ABC of avalanche safety.
LaChapelle, E.R., Seattle, WA, Mountaineers, 1985, 112p., Second edition. 15 refs.
DLC QC929.A8L3 1985
Avalanche mechanics, Cold weather survival, Safety, Rescue operations, Snow cover stability, Avalanche forecasting, Terminology.

46-4465
Measurements of the optical depth and retrieval of aerosol parameters in the polar regions.
Herber, A., et al, *Journal of aerosol science*, 1991, 22(Suppl.1), European Aerosol Conference, 19th, Karlsruhe, Germany, Sep. 16-20, 1991. Proceedings, p.S415-S418, 9 refs.
Wendisch, M., Leiterer, U., Notholt, J.
Polar atmospheres, Aerosols, Atmospheric density, Solar radiation, Photometry, Particle size distribution, Air pollution, Climatology.
Measurements of the direct sunlight in the UV/VIS have been performed in the Arctic, Antarctica and Germany to obtain the aerosol optical depth. The aerosol optical depth has been inverted in two ways to get the aerosol size distribution. The results show that in the Arctic due to the continental influence the values for the aerosol optical depth and for the number and size of aerosols are much higher than in the Antarctic. In both regions aerosol fluctuations and bimodal distributions can be observed. (Auth.)

46-4466
Outdoor measuring device to determine the washout and snowout coefficient while controlling the boundary conditions.
Sparmacher, H., et al, *Journal of aerosol science*, 1991, 22(Suppl.1), European Aerosol Conference, 19th, Karlsruhe, Germany, Sep. 16-20, 1991. Proceedings, p.S521-S524, 1 ref.
Fülber, K., Bonka, H.
Atmospheric composition, Precipitation (meteorology), Aerosols, Scavenging, Measuring instruments, Falling snow, Particle size distribution.

46-4467
Deposition of particle bound substances in wintertime fog.
Trautner, F., et al, *Journal of aerosol science*, 1991, 22(Suppl.1), European Aerosol Conference, 19th, Karlsruhe, Germany, Sep. 16-20, 1991. Proceedings, p.S529-S532, 2 refs.
Frank, G., Tschiersch, J.
Fog, Condensation, Aerosols, Hoarfrost, Sampling, Ion density (concentration), Particle size distribution, Air pollution, Chemical analysis.

46-4468
In-cloud scavenging by snow at a high-alpine site.
Baltensperger, U., et al, *Journal of aerosol science*, 1991, 22(Suppl.1), European Aerosol Conference, 19th, Karlsruhe, Germany, Sep. 16-20, 1991. Proceedings, p.S541-S544, 10 refs.
Snowfall, Alpine landscapes, Sampling, Atmospheric composition, Aerosols, Scavenging, Chemical properties, Cloud physics, Ion density (concentration), Air pollution.

46-4469
Concerning "mechanism adsorption-freezing" on mixed aerosol particles and ice forming mechanism of silver iodide.
Smorodin, V.E., *Journal of aerosol science*, 1991, 22(Suppl.1), European Aerosol Conference, 19th, Karlsruhe, Germany, Sep. 16-20, 1991. Proceedings, p.S549-S552, 4 refs.
Aerosols, Ice formation, Atmospheric composition, Water films, Hydrodynamics, Ice nuclei, Silver iodide, Adsorption, Heterogeneous nucleation.

46-4470
Temperature activation spectrum of atmospheric ice nuclei and mechanisms of heterogeneous ice nucleation in supercooled clouds.
Smorodin, V.E., *Journal of aerosol science*, 1991, 22(Suppl.1), European Aerosol Conference, 19th, Karlsruhe, Germany, Sep. 16-20, 1991. Proceedings, p.S553-S555, 3 refs.
Supercooled clouds, Ice nuclei, Heterogeneous nucleation, Aerosols, Cloud physics, Temperature effects, Sublimation.

46-4471
Ice nuclei concentrations in the vicinity of anthropogenic sources.
Parshutkina, I.P., *Journal of aerosol science*, 1991, 22(Suppl.1), European Aerosol Conference, 19th, Karlsruhe, Germany, Sep. 16-20, 1991. Proceedings, p.S557-S560, 4 refs.
Aerosols, Air pollution, Sampling, Ice nuclei, Lead iodide, Atmospheric composition, Motor vehicles, Chemical properties, Soil composition, Weather modification.

46-4472
Aerosol deposition to a snow surface.
Tschiersch, J., et al, *Journal of aerosol science*, 1991, 22(Suppl.1), European Aerosol Conference, 19th, Karlsruhe, Germany, Sep. 16-20, 1991. Proceedings, p.S565-S568, 4 refs.
Aerosols, Snow surface, Snow impurities, Particle size distribution, X ray analysis, Chemical composition, Air pollution, Ice fog.

46-4473
Characteristics of atmospheric particles (airborne and in snowpack) at Khumbu Glacier in the Nepalese Himalayas (EV-K2-CNR project).
Vivarelli, F., et al, *Journal of aerosol science*, 1991, 22(Suppl.1), European Aerosol Conference, 19th, Karlsruhe, Germany, Sep. 16-20, 1991. Proceedings, p.S585-S588, 4 refs.
Santachiara, G., Prodi, F.
Aerosols, Atmospheric composition, Sampling, Glacier ice, Snow composition, Condensation nuclei, Stratigraphy, Chemical composition.

46-4474
Condensation nuclei measurements at the Georg von Neumayer Station (F.R.G.), coastal Antarctica.
Lehmann, E., et al, *Journal of aerosol science*, 1991, 22(Suppl.1), European Aerosol Conference, 19th, Karlsruhe, Germany, Sep. 16-20, 1991. Proceedings, p.S589-S592, 9 refs.
Jaenicke, R.
Polar atmospheres, Aerosols, Condensation nuclei, Atmospheric composition, Particle size distribution, Sampling, Antarctica—Georg von Neumayer Station.
The analysis of nearly continuous records of surface-based atmospheric condensation nuclei concentration (CNC) since 1984 up to the present at the Georg von Neumayer Station shows clearly an annual cycle of CNC with low values in winter time, and a significantly increasing frequency of CNC of more than 1,000 particles per cu cm over the years. (Auth. mod.)

46-4475
Antarctica from NOAA satellites. Clouds, ice and snow.
Yamanouchi, T., comp., Tokyo, National Institute of Polar Research, 1992, 91p., In Japanese and English. 19 refs.
Seko, K., comp.
Spaceborne photography, Imaging, Mapping, Radiometry, Ice sheets, Snow, Sea ice, Ice air interface, Wind (meteorology), Clouds (meteorology), Meteorological factors, Antarctica—Showa Station.

This book is organized into 4 chapters: Ch.1 is an introduction, explaining the Antarctic Climate Research (ACR) plan and the role of NOAA satellite observations and data in it, and giving an overview of the satellite observations. Ch.2 discusses clouds, a subject on which a great deal is expected from meteorological satellite observations. Ch.3 shows the sea ice around Antarctica, which responds to climatic variations in a relatively short time and in turn is thought to cause climatic variations. Ch.4 shows the antarctic ice sheet and the interaction between its surface condition and atmospheric phenomena, such as katabatic winds. The enclosed NOAA satellite AVHRR images of an area in East Antarctica, which are received at Showa Station, cover the 4-year period, starting in 1987, of the ACR Project.

46-4476

Pesticides in ground water, surface water and spring runoff in a small Saskatchewan watershed.

Waite, D.T., et al, *Environmental toxicology and chemistry*, 1992, 11(6), p.741-748. 21 refs.

Watersheds, Sampling, Ground water, Water pollution, Snowmelt, Runoff, Environmental impact, Snow impurities, Ion density (concentration), Agriculture.

46-4477

Hailpad data reduction by computer.

Rafanelli, C., et al, *Environmental software*, Dec. 1991, 6(4), p.220-226, 10 refs.

Montefinale, T., Ferrari, P.

Hailstones, Measurement, Physical properties, Image processing, Computer programs, Meteorological data, Data processing, Weather forecasting, Precipitation (meteorology).

46-4478

Chemistry of rime and snow collected at a site in the central Washington Cascades.

Duncan, L.C., *Environmental science and technology*, Jan. 1992, 26(1), p.61-66, 20 refs.

Snow composition, Chemical composition, Hoarfrost, Air pollution, Sampling, Mountains, Precipitation (meteorology), Clouds (meteorology), Ion density (concentration).

46-4479

Collecting supercooled cloud droplets as a function of droplet size.

Hindman, E.E., et al, *Journal of atmospheric and oceanic technology*, Aug. 1992, 9(4), p.337-353, 43 refs.

Carter, E.J., Borys, R.D., Mitchell, D.L.

Supercooled clouds, Cloud droplets, Samplers, Design, Performance, Icing, Water content, Hoarfrost, Ice cover effect, Accuracy.

46-4480

Interpretation of field measurements made with a portable albedometer.

van der Hage, J.C.H., *Journal of atmospheric and oceanic technology*, Aug. 1992, 9(4), p.420-425, 3 refs.

Albedo, Measuring instruments, Portable equipment, Design, Radiation balance, Glacier surveys, Surface energy, Resolution, Performance.

46-4481

Temperatures: diverging extremes.

Hickox, D.H., *Weatherwise*, Feb.-Mar. 1992, 45(1), p.52-55, 2 refs.

Air temperature, Records (extremes), Seasonal variations, Meteorological data, Climatology.

46-4482

Heat capacity, entropy and enthalpy of silicone-poly(styrene butadiene) rubber blends from 80 to 300 K.

Bhowmick, T., et al, *Cryogenics*, 1992, 32(7), p.616-622, 10 refs.

Gupta, B.R., Pattanayak, S.

Rubber, Polymers, Low temperature tests, Cryogenics, Heat capacity, Enthalpy, Thermal analysis, Design criteria, Temperature effects.

46-4483

Thermal conductivity and thermal diffusivity of silicone-poly(styrene butadiene) rubber blends from 60 to 300 K.

Bhowmick, T., et al, *Cryogenics*, 1992, 32(7), p.623-627, 10 refs.

Gupta, B.R., Pattanayak, S.

Rubber, Polymers, Low temperature tests, Cryogenics, Thermal conductivity, Thermal diffusion, Thermal analysis, Design criteria, Temperature effects.

46-4484

Analytical study of a two-layer transient thermal conduction problem as applied to soil temperature surveys.

Larson, T.H., et al, *Geophysics*, Feb. 1992, 57(2), p.306-312, 15 refs.

Hsui, A.T.

Soil surveys, Soil temperature, Thermal conductivity, Temperature measurement, Subsurface investigations, Thermal diffusion, Interfaces, Layers, Analysis (mathematics).

46-4485

Boiling and freezing simultaneously—with a feeble vacuum pump.

Ellison, M., *Journal of chemical education*, Apr. 1992, 69(4), p.325-326, 2 refs.

Education, Experimentation, Vacuum freezing, Liquid cooling, Temperature effects, Phase transformations.

46-4486

Sea ice elastic moduli: determination of Biot parameters using in-field velocity measurements.

Williams, K.L., et al, *Acoustical Society of America. Journal*, May 1992, 91(5), p.2627-2636, 38 refs.

Francois, R.E.

Sea ice, Ice cores, Ice elasticity, Acoustic measurement, Wave propagation, Velocity measurement, Porosity, Physical properties, Temperature effects.

46-4487

Studies of measurement and calculation methods of accumulation on Glacier No.1.

Yang, D.Q., et al, *Journal of glaciology and geocryology*, Mar. 1992, 14(1), p.1-10, In Chinese with English summary. 22 refs.

Glacier alimentation, Glacier surveys, Snow surveys, Mountain glaciers, Snow accumulation, Snow stakes, Snow cover distribution, China—Tian Shan.

46-4488

Ice crystal measurement and its climatic significance of a marginal ice core from East Antarctica.

Yao, T.D., et al, *Journal of glaciology and geocryology*, Mar. 1992, 14(1), p.11-17, In Chinese with English summary. 12 refs.

Petit, J.

Ice cores, Ice crystal growth, Paleoclimatology, Ice crystal size, Antarctica—East Antarctica.

Ice crystals were measured from a marginal ice core from East Antarctica. The climatic significance related to ice crystals was discussed. A comparison was made between the Dunde ice core results and other ice core results. Based on the changes of ice crystals along the depth and the abrupt changes of ice crystals during the last Ice Age, it was concluded that climate can not only affect the growth rate of ice crystals, but also affect ice crystal size under specific climatic condition (e.g. last Ice Age). The fact that climatic information can be preserved in the marginal ice of an ice sheet indicates that the conclusion that ice crystal growth rate can be influenced by ice surface temperature memory also applies to marginal ice of an ice sheet.

46-4489

Application of ridge regression analysis for forecasting snowmelt runoff.

Lan, Y.C., et al, *Journal of glaciology and geocryology*, Mar. 1992, 14(1), p.19-24,18, In Chinese with English summary. 7 refs.

Wang, X.M.

Snowmelt, Runoff forecasting, Statistical analysis, Reservoirs.

46-4490

Comparative analysis of simulated daily runoff for the rivers of inland arid area in Xinjiang.

Zhang, G.W., et al, *Journal of glaciology and geocryology*, Mar. 1992, 14(1), p.25-32, In Chinese with English summary. 2 refs.

Liu, Z.H., Shang, S.C., Huo, Y.

Snowmelt, Runoff forecasting, River flow, River basins, Deserts, Mathematical models, China—Xinjiang.

46-4491

Spore-pollen records of glaciation-loess cycles in Huining area in the west part of the loess plateau since 660,000 a B.P.

Liu, J.F., *Journal of glaciology and geocryology*, Mar. 1992, 14(1), p.33-43, In Chinese with English summary. 11 refs.

Paleoclimatology, Pollen, Loess, Paleobotany, Glaciation, Deserts, Stratigraphy, Steppes.

46-4492

Approach on the Quaternary strata and the palaeogeographical environmental evolution in source region of the Yellow River.

Wang, S.L., et al, *Journal of glaciology and geocryology*, Mar. 1992, 14(1), p.45-54,44, In Chinese with English summary. 2 refs.

Li, W.Q.

Quaternary deposits, Paleoclimatology, Stratigraphy, Permafrost dating, Pollen, Alpine glaciation, China—Qinghai-Xizang Plateau.

46-4493

Coastal retreat and permafrost thermal regimes, western Canadian Arctic.

Wang, B.L., *Journal of glaciology and geocryology*, Mar. 1992, 14(1), p.55-62, In Chinese with English summary. 14 refs.

Permafrost thermal properties, Subsea permafrost, Shoreline modification, Climatic changes, Mathematical models.

46-4494

Paleoglaciation and gold placer in East Mountains Region in Altai Mountains.

Ulkunbek, M., et al, *Journal of glaciology and geocryology*, Mar. 1992, 14(1), p.63-72, In Chinese with English summary. 9 refs.

Ye, W., Chen, X.F.

Alpine glaciation, Paleoclimatology, Gold, Placer mining, Minerals, Geochemistry, Quaternary deposits, China—Altai Mountains.

46-4495

Debris flow in the ice tongue area of Hailuogou Glacier on the eastern slope of Mt. Gongga.

Lu, R.R., et al, *Journal of glaciology and geocryology*, Mar. 1992, 14(1), p.73-80, In Chinese with English summary. 5 refs.

Gao, S.H.

Glacier tongues, Avalanches, Mudflows, Outwash, Moraines, Slope stability, China—Gongga Mountain.

46-4496

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Huang, Y.Z.

Permafrost beneath roads, Active layer, Thaw depth, Permafrost surveys, Seismic refraction, Pavements.

46-4497

Analysis of frost damage to buildings in island taliks, Tuotuo River Army Service Station.

Huang, Y.Z., et al, *Journal of glaciology and geocryology*, Mar. 1992, 14(1), p.87-90,86, In Chinese with English summary. 3 refs.

Guo, D.X.

Taliks, Permafrost beneath structures, Settlement (structural), Military facilities.

46-4498

Polar ice cores—climatic and environmental records.

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Ice cores, Paleoclimatology, Atmospheric composition, Global warming, Greenland, Antarctica—Vostok Station.

Ice cores from Greenland and Antarctica provide multiple proxy records of climate and environmental parameters. They show evidences of anthropogenic impact on atmospheric greenhouse gases. Increase over the last 200 years is 20% for CO2, 8% for N2O and more than 200% for CH4. The antarctic Vostok ice core has shown signatures of the insolation orbital forcing as well as a close association between temperature and greenhouse gas concentrations; CO2 and CH4 concentrations respectively increase by about 40% and 100% during glacial-interglacial climate changes by amplifying, together with the growth and decay of the Northern Hemisphere ice sheets, the orbital forcing. Climate sensitivity to greenhouse forcing estimated from paleo-ice core data is consistent with GCM simulations giving a 3-4 C warming for a future doubled atmospheric CO2. (Auth. mod.)

46-4499

Holocene deglaciation in north Tianshan, USSR.

Mel'nikova, A.P., et al, *Journal of glaciology and geocryology*, Dec. 1991, 13(4), p.291-298, In Chinese with English summary. 26 refs.

Bakov, E.K.

Glacier oscillation, Paleoclimatology, Glacier surveys, Pollen, Alpine glaciation, USSR—Tien Shan.

46-4500

Lake transgression and reasons during last glaciation maximum on the north margin of Qinghai-Xizang Plateau.

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Li, S.J.

Alpine glaciation, Paleoclimatology, Glacial lakes, Lacustrine deposits, Water level, China—Qinghai-Xizang Plateau.

46-4501

Pollen assemblage and climatic fluctuations in Lanzhou river basin since 10,000 a B.P.

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Chen, F.H., Cao, J.X.

Paleoclimatology, Pollen, River basins, Paleobotany, China—Lanzhou.

46-4502
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Han, S.T.
Climatic changes, Precipitation (meteorology), Paleoclimatology, Glacier oscillation, Growth, China - Xinjiang.

46-4503
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Bricks, Frost heave, Freeze thaw tests, Moisture transfer, Freezing front.

46-4504
Characteristic at boundary face of ice-bedrock on the upper region of Shaksgam Valley, Karakoram.
Kang, J.C., et al. *Journal of glaciology and geocryology*, Dec. 1991, 13(4), p.331-336, In Chinese with English summary. 14 refs.
He, Y.Q.
Glacier beds, Basal sliding, Mountain glaciers, Subglacial observations, Talus, Grain size.

46-4505
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Deng, Y.X., *Journal of glaciology and geocryology*, Dec. 1991, 13(4), p.337-342,330, In Chinese with English summary. 8 refs.
Moraines, Glacial erosion, Mountain glaciers, Grain size, Glacial deposits, USSR--Tien Shan.

46-4506
Effect of identifying permafrost by apparent resistivity logging.
Long, Z.Y., *Journal of glaciology and geocryology*, Dec. 1991, 13(4), p.343-348, In Chinese with English summary.
Permafrost surveys, Permafrost thickness, Electromagnetic prospecting, Electrical logging, Permafrost depth, Permafrost indicators.

46-4507
Hydraulic conductivity measurements of frozen soil by needle probe methods.
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Fukuda, M.
Frozen ground thermodynamics, Soil water migration, Moisture transfer, Thermal conductivity, Probes, Heat transfer, Mathematical models.

46-4508
Capacitor scanning thermocouple multichannel temperature data logger.
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Frozen ground temperature, Soil temperature, Thermocouples, Temperature measurement, Electrical logging, Data processing.

46-4509
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Ice age theory, Paleoclimatology, Global change, Solar radiation.

46-4510
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Global warming, Atmospheric composition, Atmospheric circulation, Air ice water interaction, Air pollution, Mathematical models.

46-4511
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Mel'nikova, N.G.
Glacier surveys, Glacier oscillation, Paleoclimatology, Mountain glaciers, Forest lines, Growth, USSR--Tien Shan.

46-4512
Simple method on estimating glacial mass balance.
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Xie, Z.C.
Glacier mass balance, Glacier oscillation, Mountain glaciers, Seasonal ablation, Mathematical models.

46-4513
Preliminary study on the drainage system in the ablation area of the Glacier No.1 at the source of Urumqi River.
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Subglacial drainage, Glacial hydrology, Glacier ablation, Meltwater, Mathematical models.

46-4514
Analysis of recent change on runoff of melt ice and snow in head of Urumqi River.
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Glacial hydrology, Meltwater, Subglacial drainage, Seasonal ablation, Runoff.

46-4515
Elastoplastic calculation of bottom heave in artificially frozen shaft.
Ma, W., et al, *Journal of glaciology and geocryology*, Sep. 1991, 13(3), p.237-246, In Chinese with English summary. 4 refs. For another version see 46-2770.
Wu, Z.W.
Soil freezing, Artificial freezing, Frost heave, Soil pressure, Soil stabilization, Frozen ground compression, Shaft sinking, Mathematical models.

46-4516
Frost susceptibility of powdered calcium carbonate.
Chen, X.B., et al, *Journal of glaciology and geocryology*, Sep. 1991, 13(3), p.247-253, In Chinese with English summary. 3 refs.
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Frost resistance, Frost heave, Construction materials.

46-4517
Application of d.c. electric sounding for permafrost exploration along Xinjiang-Xizang Highway.
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46-4518
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Ice coring drills, Glacier surveys, Portable equipment.

46-4519
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Periglacial processes, Ice wedges, Ground ice, Paleoclimatology, Pingos, Permafrost indicators, Permafrost origin.

46-4520
Experimental fracture mechanics of asphaltic concretes in the linear elastic regime.
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Concrete pavements, Concrete strength, Concrete freezing, Bituminous concretes, Frost resistance, Cracking (fracturing), Cold stress, Strain tests.

46-4521
Glaciological research in Norway, 1990 and 1991. [Glasiologiske undersökelser i Norge 1990 og 1991],
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Haakensen, N., ed.
Glacier surveys, Glacier mass balance, Glacier oscillation, Seasonal variations, Ice (water storage), Norway.

46-4522
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Organizations, Research projects, International cooperation.

46-4523
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Ocean waves, Sea states, Wind factors, Marine meteorology, Ice edge, Ice conditions, Statistical analysis, Labrador Sea, Canada - Saint Lawrence, Gulf, Great Lakes.

46-4524
System identification applied to ice breaking resistance.
Baker, D.N., et al. *Transport Canada. Publication*, Feb. 1992, TP 11262E, 47p. + appends., With French summary. 12 refs.
Goheen, K.
Icebreakers, Ice breaking, Ice navigation, Ice loads, Ice solid interface, Metal ice friction, Environmental tests, Computer programs, Mathematical models.

46-4525
Cold Regions Research and Engineering Laboratory.
Sea technology, Jan. 1990, 31(1), p.59.
Organizations, Research projects, Laboratories.

46-4526
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46-4527
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Zryd, A., *Zürich. Eidgenössische Technische Hochschule. Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie. Mitteilungen*, 1991, No.114, 168p., In French with English summary. Refs. p.158-167.
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46-4528
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46-4529
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46-4530
Urban snowmelt and runoff in northern Sweden.
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Westerström, G.
Runoff, Precipitation (meteorology), Seepage, Snowmelt, Snow hydrology, Radiation absorption, Surface drainage, Pavements, Snow disposal, Municipal engineering.

46-4531
Study of conditions for the occurrence of hail, observable from satellite radar surveys.
Bukharov, M.V., et al. *Soviet journal of remote sensing*, June 1992, 9(6), p.1001-1021. Translated from Issledovanie Zemli iz kosmosa. 8 refs.
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Hail clouds, Precipitation (meteorology), Spaceborne photography, Side looking radar, Detection, Meteorological factors, Synoptic meteorology, Weather forecasting.

46-4532
Development of convective flow during the melting of ice in a porous medium heated from above.
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DLC TJ260.A415 1990
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46-4533
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Besant, R.W., Rezkallah, K.S.
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Thermal insulation, Porous materials, Ice formation, Vapor diffusion, Condensation, Heat loss, Heat flux, Phase transformations, Synthetic materials, Performance.

46-4534
On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff *run and on the preventions of the hazard.*
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DLC TL505.I64 1991
Aircraft icing, Ice accretion, Slush, Countermeasures, Antifreezes, Turbulent boundary layer, Ice air interface, Mathematical models, Temperature effects, Meteorological data.

46-4535
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Road maintenance, Concrete heating, Storage, Shelters, Cost analysis.

46-4536
***Tests prove* calcium chloride's effectiveness.** *Better roads*, Oct. 1990, 60(10), p.31-32.
Road maintenance, Chemical ice prevention, Salting.

46-4537
On the relation between climate and retreat of Glacier AX010 in the Nepal Himalaya from 1978 to 1989.
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Glacier surveys, Glacier oscillation, Glacier mass balance, Mountain glaciers, Climatic factors, Climatic changes, Mathematical models, Nepal.

46-4538
***Fluctuations* of the glaciers from the 1970s to 1989 in the Khumbu, Shorong and Langtang regions, Nepal Himalayas.**
Yamada, T., et al. *Bulletin of glacier research*, Apr. 1992, No.10, p.11-19, 15 refs.
Glacier surveys, Glacier oscillation, Mountain glaciers, Nepal.

46-4539
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Glacier surveys, Glacier oscillation, Glacier mass balance, Glacier alimentation, Mountain glaciers, Nepal.

46-4540
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Glacier surveys, Glacier oscillation, Glacier thickness, Glacier flow, Expeditions, Patagonia.

46-4541
Characteristics and variations of Upsala and Moreno glaciers, southern Patagonia.
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Glacier surveys, Glacier oscillation, Glacier ablation, Glacial lakes, Patagonia.

46-4542
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Glacier surveys, Glacier flow, Glacier oscillation, Patagonia.

46-4543
Ice flow and surface lowering of Tyndall Glacier, southern Patagonia.
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Glacier surveys, Glacier flow, Glacier oscillation, Patagonia.

46-4544
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Casassa, G., *Bulletin of glacier research*, Apr. 1992, No.10, p.69-74, 17 refs.
Glacier surveys, Glacier thickness, Radio echo soundings, Radar echoes, Patagonia.

46-4545
Foliation on Tyndall Glacier, southern Patagonia.
Casassa, G., *Bulletin of glacier research*, Apr. 1992, No.10, p.75-77, 11 refs.
Glacier surveys, Glacier flow, Glacier surfaces, Patagonia.

46-4546
Measurements of meteorological conditions and ablation at Tyndall Glacier, southern Patagonia, in December 1990.
Koizumi, K., et al. *Bulletin of glacier research*, Apr. 1992, No.10, p.79-82, 9 refs.
Naruse, R.
Glacier surveys, Glacier ablation, Glacial meteorology, Meteorological factors, Ice air interface, Patagonia.

46-4547
Glacier variation in the Northern Patagonia Icefield, *Chile, between 1985/86 and 1990/91.*
Aniya, M., *Bulletin of glacier research*, Apr. 1992, No.10, p.83-90, 4 refs.
Glacier surveys, Glacier oscillation, Glacier ablation, Patagonia.

46-4548
Preliminary report on the air temperature in Reindalen, west Spitsbergen.
Shiraiwa, T., et al, *Bulletin of glacier research*, Apr. 1992, No.10, p.91-97, 5 refs.
Sawagaki, T.
Air temperature, Surface temperature, Glacial meteorology, Soil air interface, Permafrost, Microclimatology, Norway—Spitsbergen.

46-4549
Altitudinal distribution of glaciers on volcanic cones in the Cascade Range, North America.
Kobayashi, M., *Bulletin of glacier research*, Apr. 1992, No.10, p.99-104, 9 refs.
Mountain glaciers, Snow line, Alpine glaciation, Altitude, Glacier surveys, Volcanoes.

46-4550
***Oceanography* of winter leads.**
Morison, J.H., et al, *Journal of geophysical research*, July 15, 1992, 97(C7), p.11,199-11,218, 31 refs.
McPhee, M.G., Curtin, T.B., Paulson, C.A.
Oceanography, Polynyas, Ice edge, Air ice water interaction, Convection, Ocean currents, Boundary layer, Turbulence, Thermodynamics.

46-4551
On the response of the equilibrium thickness distribu*tion of sea ice to ice export, mechanical deformation,* and thermal forcing with application to the Arctic Ocean.
Björk, G., *Journal of geophysical research*, July 15, 1992, 97(C7), p.11,287-11,298, 17 refs.
Sea ice distribution, Ice models, Ice cover thickness, Pack ice, Ice water interface, Ice melting, Ice heat flux, Thermodynamics, Mathematical models, Ice deformation.

46-4552
Laboratory simulation of exchange through Fram Strait.
Hunkins, K.L., et al, *Journal of geophysical research*, July 15, 1992, 97(C7), p.11,299-11,321, 45 refs.
Whitehead, J.A.
Ocean currents, Buoyancy, Fluid dynamics, Simulation, Water temperature, Wind factors, Water transport, Climatic factors, Mechanical tests, Density (mass/volume).

46-4553
Sea spray and the turbulent air-sea heat fluxes.
Andreas, E.L., *Journal of geophysical research*, July 15, 1992, 97(C7), MP 3113, p.11,429-11,441, 76 refs
Sea spray, Air water interactions, Air temperature, Drops (liquids), Heat flux, Turbulent boundary layer, Moisture transfer, Analysis (mathematics), Wind factors, Cloud physics.
Heat and moisture carried by sea spray have long been suspected of contributing to the air-sea fluxes of sensible and latent heat. Using time scales that parameterize how long sea spray droplets reside in the air and how quickly they exchange heat and moisture with their environment, the author estimates sea spray contributions to the air-sea heat fluxes. To make these estimates, a new sea spray generation function that predicts more realistic spume production than earlier models is developed. Spray droplets with initial radii between 10 and 300 microns contribute most to the heat fluxes; the vast majority of these are spume droplets. The modeling not only demonstrates how spray droplets participate in the air-sea heat exchange but also confirms earlier predictions that the heat carried by sea spray (especially the latent heat) is an important component of the air-sea heat balance. In cited examples, the maximum magnitude of the spray latent heat flux for a 20 m/s wind is 170 W/sq m; the maximum spray sensible heat flux is 33 W/sq m. For winds over 10 m/s, the spray latent heat flux is usually a substantial fraction of the interfacial (or turbulent) latent heat flux (estimated from the bulk-aerodynamic equations), and will thus confound measurements of the air-sea transfer coefficient for latent heat.

46-4554
***Solar* aqua-ammonia absorption refrigerator simulation.**
Elegido, E., et al, *International journal of ambient energy*, Oct. 1991, 12(4), p.199-204, 7 refs.
De Juana, J.M., Herrero, M.A.
Refrigeration, Ice makers, Computerized simulation, Solutions, Performance, Absorption, Solar radiation, Cost analysis.

46-4555
Study of heat exchange under frosting conditions.
Östin, R., *Heat recovery systems & CHP*, Mar. 1992, 12(2), p.89-103, 12 refs.
Radiant heating, Surface temperature, Hoarfrost, Ice formation, Ice cover effect, Performance, Heat transfer coefficient, Ice solid interface, Thermodynamic properties, Temperature distribution.

46-4556
Rock glacier in south Ellendalen, Lyngen Alps, Troms.
Whalley, W.B., *Norsk geografisk tidsskrift*, Mar. 1992, 46(1), p.29-31, 11 refs.
Rock glaciers, Periglacial processes, Frozen ground mechanics, Moraines, Geocryology, Distribution, Valleys, Geomorphology, Glacial geology.

46-4557
Greenhouse-effect predictions viewed from the perspective of the vegetational history.
Hafsten, U., *Norsk geografisk tidsskrift*, Mar. 1992, 46(1), p.33-40, 19 refs.
Palynology, Global warming, Vegetation patterns, Climatic changes, Forest lines, Paleobotany, Paleoclimatology, Carbon dioxide, Temperature variations.

46-4558
Freezing behaviour of microencapsulated water.
Yamane, H., et al, *Journal of microencapsulation*, July-Sep. 1992, 9(3), p.279-286, 12 refs.
Ohshima, H., Kondo, T.
Water, Supercooling, Freezing points, Temperature measurement, Drops (liquids), Colloids, Thermodynamics, Physical properties, Microanalysis.

46-4559
Platinum group elements and Au in arctic vegetation growing on gossans, Keewatin District, Canada.
Rencz, A.N., et al, *Journal of geochemical exploration*, June 1992, 43(3), p.265-279, 18 refs.
Hall, G.E.M.
Plant tissues, Gold, Vegetation factors, Exploration, Geophysical surveys, Mineralogy, Sampling, Mining, Arctic landscapes, Chemical composition.

46-4560
Reconnaissance exploration geochemistry in the central Brooks Range, northern Alaska: implications for exploration of sediment-based zinc-lead-silver deposits.
Kelley, K.D., et al, *Journal of geochemical exploration*, Feb. 1992, 42(2-3), p.273-300, 38 refs.
Kelley, D.L.
Continuous permafrost, Sediments, Exploration, Geophysical surveys, Lithology, Mineralogy, Sampling, Accuracy, Quaternary deposits, Geochemistry.

46-4561
Radioactive precipitation levels on King George I. [Níveis de precipitação radioativa na ilha Rei George],
Godoy, J.M., et al, Ciências atmosféricas e espaciais na Antártica. Anais do I Seminário Sobre Ciências Atmosféricas e Espaciais do Programa Antártico Brasileiro. (Atmospheric and space sciences in Antarctica. First Seminar on Atmospheric and Space Sciences of the Brazilian Antarctic Program, São José dos Campos, Apr. 27-29, 1988. Proceedings.) Edited by E.B. Pereira and V.W.J.H. Kirchhoff, Brazil, Instituto de Pesquisas Espaciais, 1989, p.130-137, In Portuguese with English summary. 2 refs.
Reis, V.R.G., Récio, J.C.
Fallout, Plant ecology, Snow impurities, Impurities, Antarctica--King George Island.
Due to atmospheric nuclear tests from 1940 to 1980, different radioactive elements of long half-life (Sr-90, Cs-137) were introduced into the atmosphere. Year by year, these radionucludes precipitate on the earth's surface as radioactive fallout. The biosphere in particular is a good radioactive fallout accumulator and it is the basic medium used in this work. During 1986, samples of moss were collected and analyzed on King George I., as well as additional samples of ice, snow, sea water and sediments. The results confirm small levels of radioactivity in all of the studied materials with the exception of mosses, which showed higher concentrations. Experimental results obtained with these samples are presented and a proposal for future work on this project is discussed. (Auth.)

46-4562
Characteristics and physical processes affecting antarctic climate. [Características e processos físicos que afetam o clima da Antártica],
Satyamurty, P., et al, Ciências atmosféricas e espaciais na Antártica. Anais do I Seminário Sobre Ciências Atmosféricas e Espaciais do Programa Antártico Brasileiro. (Atmospheric and space sciences in Antarctica. First Seminar on Atmospheric and Space Sciences of the Brazilian Antarctic Program, São José dos Campos, Apr. 27-29, 1988. Proceedings.) Edited by E.B. Pereira and V.W.J.H. Kirchhoff, Brazil, Instituto de Pesquisas Espaciais, 1989, p.139-161, In Portuguese with English summary. 24 refs.
Rao, V.B., Yamasaki, Y.
Sea ice distribution, Climatology, Meteorological charts, Simulation, Albedo, Snow.
Observed characteristics of the climate of Antarctica are briefly reviewed. Several physical processes which affect the climate of Antarctica are discussed. Also given is a critical discussion of the results of climatic simulation. The deficiencies of the general circulation models in simulating the observed climate are mentioned. (Auth.)

46-4563
Interaction between antarctic ice extension and Brazilian climate. [Interação entre a extensão do gelo antártico e o clima brasileiro],
Bevilaqua, R.M., Ciências atmosféricas e espaciais na Antártica. Anais do I Seminário Sobre Ciências Atmosféricas e Espaciais do Programa Antártico Brasileiro. (Atmospheric and space sciences in Antarctica. First Seminar on Atmospheric and Space Sciences of the Brazilian Antarctic Program, São José dos Campos, Apr. 27-29, 1988. Proceedings.) Edited by E.B. Pereira and V.W.J.H. Kirchhoff, Brazil, Instituto de Pesquisas Espaciais, 1989, p.175-192, In Portuguese with English summary. 9 refs.
Sea ice distribution, Ice air interface, Climatology, Ice models.
The extension of the antarctic ice is analyzed and possible implications, especially those that would affect weather and climate, are discussed. Speculations are made about the viability of climatic anomaly forecasting. (Auth.)

46-4564
Dynamics and the ozone distribution in the winter stratosphere: modelling the inter-hemispheric differences.
Cariolle, D., et al, *Journal of atmospheric and terrestrial physics*, May 1992, 54(5), p.627-640, 20 refs.
Amodei, M., Simon, P.
Ozone, Stratosphere, Clouds (meteorology), Models.
Model results of ozone distribution in both hemispheres are discussed. The model extends from ground to mesospheric levels with a spectral horizontal resolution up to isotropic wavenumber 42. It incorporates a fully interactive scheme for the ozone mixing ratio which accounts for photochemical sources and sinks, advection by the model winds and coupling with radiative calculations. The model reproduces the large scale inter-hemispheric differences quite well, with a very stable and cold vortex in the Southern Hemisphere and a warmer vortex, often distorted, in the Northern Hemisphere. It is concluded that due to interactions among dynamics, polar stratospheric cloud formation and chemistry, there is a possibility that some stratospheric ozone depletion could be effective in late winter near the night terminator in the Northern Hemisphere, whereas significant ozone depletion only occurs in early spring in the Southern Hemisphere. The importance of synoptic scale dynamics on the ozone transport between the high latitudes and the equator is also stressed. The model develops tongues of ozone-rich air from the high latitudes which are irreversibly mixed at mid-latitudes with tongues of ozone-poor air from the low latitudes. Similar tongues or filaments are clearly visible in the TOMS satellite data. (Auth. mod.)

46-4565
Abundance and feeding ecology of larger protozooplankton in the ice edge zone of the Weddell and Scotia Seas during the austral winter.
Gowing, M.M., et al, *Deep-sea research*, May 1992, 39(5A), p.893-919, Refs. p.916-919.
Garrison, D.L.
Ice edge, Plankton, Nutrient cycle, Ecology, Antarctica—Weddell Sea, Scotia Sea.
Biomasses, abundances and feeding ecology of larger (>50 micron diameter) protozooplankton were studied in the upper 210 m in the ice edge zone of the Weddell/Scotia Sea area in the austral winter of 1988. Sixty-liter water samples were taken at five depths at 17 stations, and organisms were concentrated by reverse-flow filtration. Mean abundances and biomass of the total assemblage of larger protozooplankton were measured in the upper 210 m. The abundances and biomasses are lower than for other seasons in the Antarctic, are comparable to abundances reported for several of these groups in lower latitude waters, and are attributed to slower growth and reduced food, rather than to increased mortality. The large protozooplankton fed on both autotrophic and heterotrophic organisms in winter, although the biomass of smaller forms is dominated by heterotrophs. Feeding on detrital particles also was indicated by the presence of siliceous fragments in vacuoles. The larger protozooplankton in the winter ice edge zone may be important in reducing particle flux to the deep sea and as a food source for larger zooplankton, especially from the base of the euphotic zone to 210 m. (Auth. mod.)

46-4566
Variability in sea-ice thickness over the North Pole from 1977 to 1990.
McLaren, A.S., et al, *Nature*, July 16, 1992, 358(6383), p.224-226, 9 refs.
Sea ice, Ice cover thickness, Arctic Ocean.

46-4567
Problems in the development of frozen strata; collected scientific papers. [Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei],
Shats, M.M., ed, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, 146p., In Russian. For individual papers see 46-4568 through 46-4585.
Kuz'min, G.P., ed.
Geocryology, Geomorphology, River basins, Terraces, Ground ice, Landscape development, Thermal regime, Permafrost beneath structures, Foundations.

46-4568
Role of cryomorphogenesis in the transformation of landscapes and contamination of rivers (in the example of developed regions of Northern Yakutia). [Rol' kriomorfogeneza v preobrazovanii landshaftov i zagriaznenii rek (na primere osvaivaemykh raionov Severnoi IAkutii)],
Grigor'ev, M.N., et al, Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.3-15, In Russian. 8 refs.
Kireev, V.N.
Rivers, Geomorphology, Landscape development, Water pollution, USSR—Yakutia.

46-4569
Thermoerosion in basins in the Baikal region. [Termoeroziia v kotlovinakh Pribaikal'ia].
Vyrkin, V.B., Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.15-21, In Russian. 7 refs.
Erosion, River basins, Terraces, Alluvium, Frozen rocks, Gullies, Ice erosion.

46-4570
Stratified ice deposits on the Yugorskiy Peninsula. [Iskopaemye plastovye l'dy na p-ove IUgorskom],
Gol'dfarb, IU.I., et al, Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.22-31, In Russian.
Ezhova, A.B.
Ice wedges, Ground ice, Arctic landscapes, USSR - Yugorskiy Peninsula.

46-4571
Formation characteristics of post-lacustrine meadows in arctic Yakutia. [Osobennosti obrazovaniia posleozernykh lugov Zapoliarnoi IAkutii],
Bosikov, N.P., Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.31-37, In Russian. 7 refs.
Ground ice, Ice veins, Arctic landscapes, Landscape development, Tundra.

46-4572
Characteristics of ice formation during freezing of the active layer from beneath (based on field observations in southern Gydan Peninsula). [Osobennosti l'dovydeleniia pri promerzanii sezonno-talogo sloia snizu (po naturnym nabliudeniiam na iuge p-ova Gydan)],
Konstantinov, S.A., Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.38-48, In Russian. 4 refs.
Ground ice, Ice formation, Active layer, Loams, Ice veins, USSR—Gydan Peninsula.

46-4573
Paleoglaciological reconstruction in southeastern Altay (in the example of the Kuray basin region). [Paleogliatsiologicheskie rekonstruktsii v IUgo-Vostochnom Altae (na primere raiona Kuraiskoi vpadiny)],
Novikov, I.S., Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.43-48, In Russian. 4 refs.
Paleoclimatology, Geocryology, River basins, USSR—Kuray River.

46-4574
Structural characteristics of frozen strata in some local tectonic structures in the lower course of the Vilyuy River. [Osobennosti stroeniia merzlykh tolshch nekotorykh lokal'nykh tektonicheskikh struktur v nizhnem techenii Viliuia],
Berkovchenko, S.A., Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.49-57, In Russian. 10 refs.
Geomorphology, Geocryology, River basins, Terraces, Tectonics, USSR—Vilyuy River.

46-4575
Air, soil and ground temperature in the Lena-Aldan interfluve. [Temperatura vozdukha i pochvogruntov na Leno-Aldanskom mezhdurech'e],
Vasil'ev, I.S., Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min, Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.57-67, In Russian. 4 refs.
Air temperature, Soil temperature, Frozen ground temperature, USSR—Aldan River, USSR—Lena River.

46-4576
Inter-annual variability in the parameters of the temperature regime of soils at the Chabydinskiy research station (Central Yakutia). [Mezhgodovaia izmenchivost' parametrov temperaturnogo rezhima gruntov na Chabydinskom statsionare (Tsentral'naia IAkutiia)].
Varlamov, S.P., et al. Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min. Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.68-75, In Russian. 3 refs.
Skachkov, IU.B., Skriabin, P.N.
Thaw depth, Seasonal freeze thaw, Soil temperature, Frozen ground temperature, Temperature variations, Thermal regime, USSR—Yakutia.

46-4577
Cryogenic landscape conditions in the lower course of the Adycha River. [Merzlotno-landshaftnye usloviia v nizov'iakh r.Adychi].
Murzin, IU.A., et al. Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min. Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.76-85, In Russian. 11 refs.
Torgovkin, IA.I.
Landscape types, Geocryology, Cryogenic textures, Ice veins, Permafrost structure, Permafrost thermal properties, Active layer, Moisture, Terraces, USSR—Adycha River.

46-4578
Change in cryogenic conditions from building water reservoirs in the Arctic (in the example of the Khantay water reservoir). [Izmenenie merzlotnykh uslovii pri sozdanii vodokhranilishch v Zapoliar'e (na primere Khantaiskogo vodokhranilishcha)],
Grigor'ev, N.F., Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min. Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.85-90, In Russian. 4 refs.
Reservoirs, Environmental impact, Beaches, Ground ice, Geocryology, Cold weather construction.

46-4579
Results of studies on the hydrothermal regime of irrigated fodder crops in the Amga River valley. [Rezul'taty issledovaniia vodno-teplovogo rezhima oroshaemykh kul'tur v doline r. Amgi],
Mandarov, A.A., et al. Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min. Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.90-95, In Russian.
Ugarov, I.S.
Agriculture, Irrigation, Ground ice, Hydrothermal processes, Frozen ground thermodynamics, USSR—Amga River.

46-4580
Surface stability of lower terraces of the Lena River during industrial activities. [Ob ustoichivosti poverkhnosti nizkikh terras r.Leny k tekhnogennym vozdeistviiam],
Botulu, T.A., Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min. Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.95-102, In Russian. 6 refs.
Terraces, Environmental impact, Stability, Geocryology, Engineering geology, USSR—Lena River.

46-4581
Rating the territory of the Leningrad region according to ground frost heave. [K voprosu ob otsenke territorii Leningradskoi oblasti po stepeni puchinistosti gruntov],
Chesnokova, I.V., et al. Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and .P. Kuz'min. Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.102-110, In Russian. 6 refs.
Koff, G.L.
Thermal regime, Frozen ground temperature, Frozen ground thermodynamics, Frost heave, Frost penetration, USSR Leningrad.

46-4582
Criteria for strength under rapid loads of ice bearing mixtures. [O kriteriiakh prochnosti pri skorostnom nagruzhenii ledogruntovoi smesi],
Bakharev, A.A., Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min. Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.111-116, In Russian. 3 refs.
Dynamic loads, Ice deformation, Impact strength, Velocity.

46-4583
Thermal engineering analysis of the parameters of three-dimensional ventilated foundations. [Teplotekhnicheskii raschet parametrov prostranstvennykh ventiliruemykh fundamentov],
Berdichevskii, IU.V., Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min. Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.116-128, In Russian. 10 refs.
Foundations, Ventilation, Engineering geology, Geocryology, Permafrost beneath structures, Analysis (mathematics), Frozen ground thermodynamics, Heat transfer coefficient, Surface temperature, Air temperature.

46-4584
Problem of building spring greenhouses on permafrost. [K voprosu o stroitel'stve vesennikh teplits na vechnomerzlykh gruntakh],
Petrov, V.V., Voprosy razvitiia i osvoeniia merzlykh tolshch; sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min. Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.129-131, In Russian. 2 refs.
Permafrost beneath structures, Permafrost preservation, Foundations, Cold weather construction, Analysis (mathematics).

46-4585
Construction and application of water-impervious frozen ground screens. [Sozdanie i sovershenstvovanie protivofil'tratsionnykh merzlykh zaves],
Alekseeva, O.I., Voprosy razvitiia i osvoeniia merzlykh tolshch· sbornik nauchnykh statei (Problems in the development of frozen strata; collected scientific papers). Edited by M.M. Shats and G.P. Kuz'min. Yakutsk, Institut merzlotovedeniia SO AN SSSR, 1990, p.132-139, In Russian. 14 refs.
Hydraulic structures, Earth dams, Waterproofing, Thermal regime, Taliks.

46-4586
Mechanical properties of high water content snow.
Ezaki, Y., et al. *Niigata. University. Research Institute for Hazards in Snowy Areas. Annual report*, 1991, No.13, p.25-32, In Japanese with English summary. 13 refs.
Tan, M., Izumi, K., Kobayashi, S.
Slush, Wet snow, Snow strength, Snow cover stability, Snow density, Snow water content, Mathematical models.

46-4587
Acidity of winter precipitation observed in Niigata City.
Izumi, K., *Niigata. University. Research Institute for Hazards in Snowy Areas. Annual report*, 1991, No.13, p.43-46, In Japanese. 2 refs.
Snowfall, Snow composition, Air pollution, Snow impurities, Precipitation (meteorology), Japan—Niigata.

46-4588
Meteorological data at Yamakoshi, Niigata Prefecture, during the winter of 1987-1988.
Izumi, K., et al. *Niigata. University. Research Institute for Hazards in Snowy Areas. Annual report*, 1991, No.13, p.59-66, In Japanese. 5 refs.
Kobayashi, S., Aoyama, K.
Air temperature, Snow accumulation, Meteorological data, Dew point, Wind velocity, Winter, Japan—Niigata.

46-4589
Applications of 3 dimensional computer graphics to the Doppler radar data processing.
Maki, M., et al. *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Mar. 1992, No.49, p.53-64, In Japanese with English summary. 5 refs.
Ohkura, H., Mikoshiba, T.
Snowstorms, Weather forecasting, Clouds (meteorology), Computer applications, Data processing, Radar photography.

46-4590
Studies on the process of frost damages to stone remains under cold environments and its preservation methods.
Akagawa, S., Tokyo, Shimizu Corporation, Dec. 1991. 133p., 31 refs.
Frost weathering, Frost heave, Soil freezing, Frozen rock strength, Frost action, Frost protection, Ice lenses, Unfrozen water content.

46-4591
Mean trajectory of the snow cloud as estimated from the distribution of the spatial correlation of snowfall rate in Aomori Prefecture.
Rikiishi, K., et al. *Seppyo*, Dec. 1991, 53(4), p.281-289, In Japanese with English summary. 10 refs.
Ohnishi, K.
Snowfall, Snow cover distribution, Weather forecasting, Clouds (meteorology), Wind factors, Japan - Aomori.

46-4592
State of snow depth and snow damage of young *Cryptomeria japonica* in two-storied forest.
Matsuda, M., *Seppyo*, Dec. 1991, 53(4), p.291-295, In Japanese. 7 refs.
Snow depth, Snow loads, Trees (plants), Forest canopy.

46-4593
Hydraulic approach to a snow removal system in an open channel.
Fukushima, Y., et al, *Seppyo*, Dec. 1991, 53(4), p.297-307, In Japanese with English summary. 11 refs.
Yoshinaga, K., Hayakawa, N., Okamura, K.
Snow removal, Drains, Snow hydrology, Water flow, Channels (waterways), Hydraulics, Snow loads, Mathematical models.

46-4594
Motions and vertical profiles of blowing snow particles.
Takeuchi, M., et al, *Seppyo*, Dec. 1991, 53(4), p.309-315, In Japanese. 22 refs.
Matsuzawa, M.
Blowing snow, Snowdrifts, Wind erosion, Snow erosion, Snow density, Particle size distribution, Statistical analysis.

46-4595
On the inner and outer faces of snow crystals.
Aburakawa, H., *Seppyo*, June 1992, 54(2), p.123-130, In Japanese with English summary. 15 refs.
Snow crystal structure, Ice crystal replicas, Microstructure, Photographic techniques.

46-4596
Estimation of the effects of deciduous forest to the surface snowmelt by a heat balance analysis.
Hashimoto, T., et al, *Seppyo*, June 1992, 54(2), p.131-143, In Japanese with English summary. 9 refs.
Ohta, T., Ishibashi, H.
Snowmelt, Snow heat flux, Snow air interface, Vegetation factors, Forest canopy, Mathematical models.

46-4597
Formation of air gaps in snow melting on a bottom boundary (I)—a theory for a homogeneous snow cover.
Nohguchi, Y., *Seppyo*, June 1992, 54(2), p.145-151, In Japanese with English summary. 5 refs.
Snow melting, Snow cover structure, Snow air interface, Snow hydrology, Snow density, Snow permeability, Mathematical models.

46-4598
Experimental studies of pneumatic conveying system of snow in the form of lumps.
Kumagai, M., et al, *Seppyo*, June 1992, 54(2), p.153-158, In Japanese. 8 refs.
Kobayashi, T.
Snow removal, Ducts, Air flow.

46-4599
Relation between the probability of sound tree survival and the frequency of burying by snow on Sugi plantation in the heavy snowfall region.
Noomote, M., *Seppyo*, June 1992, 54(2), p.159-164, In Japanese. 5 refs.
Snow loads, Forestry, Trees (plants), Cold weather survival.

46-4600
Glaciers-ocean-atmosphere interactions.
Kotliakov, V.M., ed. *IAHS publication*, 1991, No.208, 549p., Refs. passim. Proceedings of the International Symposium held at St. Petersburg, 24-29 September 1990. For individual papers see 46-4601 through 46-4655 or F-46649 through F-46661, F-46663 through F-46668 and I-46662
Ushakov, A., ed. Glazovskii, A.F., ed
Global change, Climatic changes, Global warming, Paleoclimatology, Ice cores, Ice cover, Sea ice, Air ice water interaction, Ice sheets.
This is a collection of papers presented at the International Symposium on Glaciers-Ocean-Atmosphere Interactions, held in St. Petersburg, USSR, Sep. 24-29, 1990. The Symposium identified a number of glacial phenomena related to interactions in the geosphere, which should be regarded as indicators of global change and/or as causes of large-scale variations. The papers presented in this volume were selected according to the Symposium topics, as follows: ice cores as indicators of global changes; sea ice in the global interaction system; modelling of ice sheets and their components; glaciation and the global sea level; ice cores and ice chemistry; mass- and heat-balance; paleovariations; ice in the water; and glaciation-atmosphere interaction.

46-4601
Deciphering recent structures and Holocene evolution of the marginal East Antarctic ice cover in Queen Maud Land.
Vaikmiae, R.A., et al. *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.3-14, 11 refs.
Paleoclimatology, Global change, Climatic changes, Isotope analysis, Ice composition, Firn stratification, Oxygen isotopes, Ice cores, Ice cover, Glaciers, Pleistocene, Antarctica – Schirmacher Ponds, Antarctica – Novolazarevskaya Station.
The isotopic composition of ice, firn and snow from northern Queen Maud Land has been studied for deciphering recent structures and Holocene evolution of this marginal area of East Antarctica. The 80‰ in oxygen isotope profile of the firn glacier with identifiable annual layers of about 20 cm of ice up to 600 m represents a unique record of the last 7000-8000 years for this region, reflecting all the main climatic changes during this time interval. Isotopic analysis of samples from the ice cover at the south periphery of the Schirmacher Ponds shows that under the Holocene ice there are some decameter thick relics of the Pleistocene ice cover with delta O-18 values of -38 to -48‰. (Auth.)

46-4602
Global changes over the last climatic cycle from antarctic ice core records.
Kotliakov, V.M., et al. *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.15-27, 22 refs.
Global change, Climatic changes, Paleoclimatology, Ice cores, Carbon dioxide, Isotope analysis, Oxygen isotopes, Snow accumulation, Aerosols, Antarctica – Vostok Station.
Isotopic temperature records of the Vostok ice core (2546 m deep) depicted two interglacial periods around 140 and 15 kyr B.P. with sharp warmings of 11 C and 9 C and a long glacial period (110-15 kyr B.P.), which included two interstadials. During coolings the snow accumulation decreased by a factor of two, the aerosol concentration increased 10-20 times and the CO2 content in the atmosphere decreased by 25-30%. The coolings were accompanied by enhanced atmospheric circulation, in particular of meridional transport. Spectral analyses of temperature and CO2 records showed the relationship between Pleistocene climate, orbital factors (obliquity, precession, eccentricity) and CO2 concentration changes. (Auth.)

46-4603
Greenhouse warming, climate sensitivity and Vostok data.
Lorius, C., et al. *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.29-47, Refs. p.44-47.
Global change, Climatic changes, Global warming, Paleoclimatology, Ice age theory, Ice cores, Carbon dioxide, Ice sheets, Antarctica – Vostok Station.
One of the main problems in estimating the possible climatic impact of doubled atmospheric CO2 from Global Circulation Models (GCMs) is to evaluate the sensitivity of the Earth's climate. In this respect, valuable empirical data are provided by climate and greenhouse gas concentration records obtained from the Vostok ice core over the last climatic cycle. The temperature profile and CO2-CH4 concentrations are closely related to significant increases of CO2 (200 to 280 ppmv) and CH4 (doubled) associated with glacial-interglacial transitions. A statistical approach shows that temperature changes can be essentially explained by a Milankovich type forcing associated with a greenhouse gas forcing. This result is in agreement with GCM simulations of the Last Glacial Maximum, both on a local (Vostok) and global scale. (Auth.)

46-4604
Studies of the internal and thermal-hydrodynamic state of the Vavilov Glacier, Archipelago Severnaya Zemlya.
Klement'ev, O.L., et al. *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.49-59, 14 refs.
Potapenko, V.IU., Savatiugin, L.M., Nikolaev, V.I.
Glacier thickness, Glacier surveys, Glacier ice, Ice cores, Glacier surfaces, Ice formation, Isotope analysis, Hydrodynamics, Thermodynamics, Ice models, USSR – Vavilov Glacier, USSR – Severnaya Zemlya.

46-4605
Temperature and precipitation fluctuations since 1600 A.D. provided by the Dunde Ice Cap, China.
Yao, T.D., et al. *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.61-70, 8 refs.
Xie, Z.C., Yang, Q.Z., Thompson, L.G.
Ice cores, Global change, Climatic changes, Isotope analysis, Oxygen isotopes, Temperature variations, Precipitation (meteorology), Glacier alimentation, Glacier ablation, China – Dunde Ice Cap.

46-4606
Total gas content in ice cores: paleoaspects.
Martinerie, P., et al. *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.71-72, 3 refs.
Raynaud, D., Lipenkov, V.IA., Barkov, N.I.
Ice cores, Global change, Paleoclimatology, Climatic changes, Ice sheets, Ice cover thickness, Porosity, Antarctica – Vostok Station.
Total gas content (V) of ice has been used in earlier works as an indicator of ice sheet (Antarctica, Greenland) thickness variations related to the last glacial-interglacial transition between about 18 and 10 kyr B.P. The Vostok ice core offers a unique opportunity for investigating V changes in the central part of East Antarctica over a full climatic cycle (approximately the last 150,000 years).

46-4607
Box thermodynamic model of sea ice.
Chuprynin, V.I., et al. *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.75-84, 5 refs.
Oreshko, A.P.
Sea ice, Ice models, Thermodynamics, Mathematical models, Ice cover thickness, Ice heat flux, Snow heat flux, Air ice water interaction, Ice cover thickness, Salinity.

46-4608
Model of the interaction of atmosphere-ocean-ice cover in the polar regions of the Earth.
Briazgin, N.N., et al. *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.85-94, 13 refs.
Dement'ev, A.A., Lubarskii, A.N.
Air ice water interaction, Sea ice, Ice cover, Mathematical models, Ice edge, Heat flux, Solar radiation, Air temperature, USSR – Kara Sea, Indian Ocean.
Investigation of the impact of radiation, thermal and circulation factors on ice cover variations of the western part of the Arctic and the Sodruzhestvo (Friendship) Sea located symmetrically in the Northern and Southern Hemispheres, was made, using a mathematical modelling method. A log-power model was used to account for the asynchronism and non-linearity of the interrelations. This model gives values more representative of the initial row than does the linear multiple regression method, and may be used for the analysis of interaction parameters of the polar regions climatic system. (Auth.)

46-4609
Study of the influence of currents on the formation of an ice cover with an aligned crystal structure in polar seas.
Strakhov, M.V., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.95-103, 12 refs.
Sea ice, Ice cover, Ice formation, Ice crystals, Ice crystal structure, Ice models, Ice cores, Ocean currents, USSR – Kara Sea, USSR – Laptev Sea.

46-4610
Growth, structure and properties of antarctic sea ice.
Ackley, S.F., *IAHS publication*, 1991, No.208, MP 3114, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.105-117, 20 refs.
Sea ice, Pack ice, Ice growth, Ice structure, Ice cover thickness, Air ice water interaction, Ice edge, Drift, Frazil ice, Antarctica – Weddell Sea.
The Weddell Gyre region is one of the more complex areas of sea ice processes in Antarctica. In the western part of the region, the pack ice persists year-round, caused by a vigorous generation and circulation of the ice, controlled by the atmospheric and ocean current forcing that is turned northward by the topographic boundary of the Antarctic Peninsula. The dynamical character of the pack ice affects the ice thickness characteristics, with the oldest, thickest ice appearing in the northwest outflow region of the western pack ice. In the eastern part, the pack is seasonal rather than perennial. The primary origin of the pack ice (0.6 m of mean ice thickness) is the rapid formation of pancake ice, controlled by the temperature and ocean wave regime at the ice edge during the advance period. (Auth.)

46-4611
Role of ocean-atmosphere interaction in the marginal zone in ice cover evolution modelling.
Speranskii, D.A., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.119-125.
Ice edge, Ice cover, Ice models, Mathematical models, Air water interactions, Air ice water interaction, Sea ice.

46-4612
Use of mathematical models when studying seasonal and climatic changes of the ice cover of the Arctic Ocean.
Appel', I.L., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.127-132.
Sea ice, Ice cover, Mathematical models, Climatic changes, Seasonal variations.

46-4613
Year-to-year variations of the ice transport from the arctic basin through some straits of the Canadian Arctic Archipelago and Fram Strait.
Mironov, E.U., et al. *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.133-141, 13 refs.
Uralov, N.S.
Sea ice, Ice mechanics, Drift, Ice cover.

46-4614
Antarctic Ice Stream B: conditions controlling its motion and interactions with the climate system.
Kamb, B., et al. *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.145-154, 45 refs.
Engelhardt, H.
Basal sliding, Geophysical surveys, Subglacial observations, Glacier ice, Glacier flow, Ice deformation, Ice sheets, Ice mechanics, Glacial deposits, Antarctica – West Antarctica.
A program of borehole geophysical measurements at the base of West Antarctic ice streams has thus far obtained from Ice Stream B some observations of temperature, basal water pressure, hydraulic parameters of the basal water system, properties of subglacial till including minimum thickness, porosity, lithology, strength, hydraulic conductivity, and incomplete observations of basal sliding and *in situ* till deformation. The base of Ice Stream B is at the melting point, the basal water pressure is within about 1 bar of the overburden pressure, and deformable subglacial till at least 3 m thick is present under the ice. These conditions favor rapid basal sliding and rapid bed deformation as ice-stream flow mechanisms. A quantitative understanding of them is needed to consider the interaction of the ice streams with the climate system. (Auth.)

46-4615
Type of plastic deformation of ice in glacier sheets.
Chashchinov, IU.M., et al. *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.155-159, 11 refs.
Rakhmanov, A.E.
Ice deformation, Ice sheets, Glacier ice, Plastic deformation, Rheology, Shear stress.
The results of an experimental investigation of ice structure and texture are analyzed. It is concluded that a scheme of the strained state of ice can be defined on the basis of this analysis. The types of processes leading to variations in the spatial structure of ice are also defined. (Auth.)

46-4616
Breakup of Wordie Ice Shelf, Antarctica.
Doake, C.S.M., et al. *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskii, p.161-165, 12 refs.
Vaughan, D.G.
Ice shelves, Calving, Crevasses, Fracturing, Temperature effects, Antarctica—Wordie Ice Shelf.
Wordie Ice Shelf has been steadily retreating since the mid-1960s, with a big breakout between 1988 and 1989. A study of satellite images taken since 1974 shows that increased crevassing and rifting is responsible for increased ice front calving, and for weakening the ice shelf upstream from the ice rises and in the center portion. A warming recorded in mean annual

air temperatures in the Marguerite Bay area has probably caused the mass balance to shift from net accumulation to net ablation, pushing the ice shelf into an unfavorable climatic regime. (Auth.)

46-4617
Explicit simulation of the mass balance of the Greenland ice sheet.
Oerlemans, J., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.167-176, 12 refs.
Ice sheets, Mass balance, Models, Simulation, Ablation, Air temperature, Global warming, Greenland.

46-4618
Gravity currents beneath ice shelves.
Jenkins, A., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.177-182, 16 refs.
Ice shelves, Ice water interface, Ice mechanics, Ice models, Simulation, Ocean currents, Antarctica—Ronne Ice Shelf.
Large-scale oceanic circulation beneath antarctic ice shelves is driven by the thermohaline differences which result from mass and energy exchange at the ice-ocean interface. Dense saline waters are drawn underneath the ice shelves and emerge, cooled and diluted, as plumes of Ice Shelf Water. A simple one-dimensional model of this process has been developed, in which the Ice Shelf Water plume is treated as a turbulent gravity current, initiated at the inland margin by a flow of fresh meltwater emerging from beneath the grounded ice. Subsequent evolution of the plume, as it ascends along a base of specified geometry, can be simulated. The model has been applied to a flowline on Ronne Ice Shelf, where steady-state melt rates have been derived from glaciological measurements. (Auth.)

46-4619
Ice sheet modelling taking account of glacier ice compressibility.
Salamatin, A.N., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.183-192, 9 refs.
Glacier ice, Mathematical models, Ice density, Firn, Ice sheets, Glacier flow, Compressive properties.
Mathematical aspects are examined in the matter of glacier dynamics theory generalization with regard to subsurface firn thickness, compressibility and densification effects, including considerations of the antarctic ice sheet conditions. (Auth. mod.)

46-4620
Interactions of ice sheets: instability and self-organization.
Mazo, V.L., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.193-205, 36 refs.
Pleistocene, Air ice water interaction, Paleoclimatology, Ice cover, Ice sheets, Ice shelves, Glaciers.

46-4621
Dynamics of antarctic glaciers in the twentieth century.
Zakharov, V.G., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.209-215, 14 refs.
Ice shelves, Air ice water interaction, Calving, Glacier oscillation, Atmospheric circulation, Glacier surveys.
An analysis of geographic, cartographic, and space data showed that during the last 100 years ice shelves and outlet glaciers of the Antarctic advanced erratically in 1902-1915, in the second half of the 1930s, at the end of the 1940s and 1950s, in 1965-1975, and in the early 1980s. The advance of glaciers alternated with their retreat and had the character of surges. On the basis of the available data on interrelated processes in the atmosphere-ocean-antarctic glaciers system, the periods of calving of glaciers may be used as indicators of changes in the intensity and character of atmospheric circulation. (Auth.)

46-4622
Fluctuations of antarctic glaciers and planetary atmospheric processes.
Zakharov, V.G., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.217-220, 6 refs.
Khmelevskaia, L.V.
Atmospheric circulation, Glacier oscillation, Ice air interface.
Data show that from 1891 until 1970, the multi-year duration of spring and pre-winter circulation seasons of the Northern Hemisphere, the snow accumulation in the region of Dome C in Antarctica, and fluctuations of antarctic glaciers, all correlate quite well, reflecting the planetary character of atmospheric processes. They develop synchronously in the Northern and Southern Hemispheres and show themselves quite clearly in the seasonal reconstructions of barometric fields of the Earth.

46-4623
Some interactions of regional glacial system elements *(The World Atlas of Snow and Ice Resources* analysis).
Glebova, L.N., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.221-228, 7 refs.
Glacier ablation, Glacier alimentation, Alpine glaciation, Mountain glaciers, Glacier tongues, Climatic factors.

46-4624
Tidewater glaciers of Spitsbergen.
Glazovskiĭ, A.F., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.229-239, 15 refs.
Macheret, IU.IA., Moskalevskiĭ, M.IU., Jania, J.
Glacier surveys, Glacier mass balance, Glacier oscillation, Calving, Glacier surfaces, Glacier thickness.

46-4625
Climate forcing due to non-sea-salt sulfates.
Saxena, V.K., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.243-255, 33 refs.
Aerosols, Climatic changes, Global warming, Ice cores, Supersaturation, Ozone, Cloud droplets, Analysis (mathematics).
The current state of the concept on ocean-derived cloud condensation nuclei (CCN) is reviewed. Salient maritime CCN sample measurements have been made in recent years and examples of CCN activation spectrum over the World Ocean are presented with an analysis of current evidence regarding the role of CCN in regulating the temperature of the earth-troposphere system. The possible impact of increased oceanic emission of dimethylsulfate (DMS) on greenhouse warming is analyzed. Further investigations of biogenic CCN are directly needed in order to advance the understanding of biosphere-geosphere interactions. Recent data from Vostok ice cores are in agreement with the idea of influence of DMS emissions on climate changes. (Auth.)

46-4626
Climate warming in the twentieth century as reflected in Svalbard ice cores.
Sin'kevich, S.A., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.257-267, 27 refs.
Global warming, Climatic changes, Ice cores, Drill core analysis, Air temperature, Stratigraphy, Glacier ablation, Glacier alimentation.

46-4627
Last deglaciation in Antarctica; evidence of a "Younger Dryas" type climatic event.
Jouzel, J., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.269-283, 45 refs.
Paleoclimatology, Climatic changes, Isotope analysis, Ice cores, Carbon dioxide, Dust, Atmospheric composition, Ice composition, Antarctica—Vostok Station, Antarctica—Charlie, Dome.
The Younger Dryas was a cold event which occurred during the last climatic transition, following the warming trend of the Bölling-Alleröd and spanning approximately a millennium from 11 to 10.2 kyr B.P. Isotopic Dome C results have shown that the transition was a two-step process, with two warming trend periods interrupted by a slightly colder period estimated to have taken place from about 13.2 to 11.7 kyr B.P. This cooling event is also well indicated in the Vostok record, but during a time interval preceding the Younger Dryas by about 1 kyr. Recent measurements of methane and dust concentration in the Vostok core are discussed as useful information for linking Northern and Southern Hemisphere observations. (Auth.)

46-4628
Late Quaternary glacio-climatic history of an East Antarctic ice sheet margin: indications from ice-cored moraines in Central Queen Maud Land.
Hermichen, W.D., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.285-289, 4 refs.
Kowski, P., Hahne, K., Vaĭkmiae, R.A.
Moraines, Paleoclimatology, Glaciation, Pleistocene, Isotope analysis, Ice cores, Antarctica—Queen Maud Land.
Studies of old moraines, covering the northern flanks of the mountains in central Queen Maud Land, have revealed relict ice from former higher glacier-surface levels inside lateral morainic ridges of successively older ages. As compared to the isotopic composition of the recent regional ice cover, these relics are depleted in oxygen-18 by 5-12‰. The isotope data indicate that during the Late Quaternary, increases of the regional ice volume were linked with cold (sub-) stages exclusively, during which the mean annual temperature was reduced by 4-10 C. A joint interpretation of data enables the glacio-climatic history of the area to the south of the Georg Forster Station to be traced. (Auth.)

46-4629
Characteristics of nival-glacial systems at high latitudes in a marine climate.
Il'ina, E.A., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.293-299, 8 refs.
Glaciation, Nivation, Albedo, Nival relief, Snow cover, Snowmelt, Snow impurities, Norway—Spitsbergen, USSR—Ural Mountains.

46-4630
Evolution of Nordaustlandet ice caps in Svalbard under climate warming.
Ignat'eva, I.IU., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.301-312, 14 refs.
Macheret, IU.IA.
Mathematical models, Temperature distribution, Glacier mass balance, Glacier thickness, Ice volume, Calving, Glacier ablation, Climatic factors, Norway—Svalbard.

46-4631
Glacier mass balance in Svalbard since 1912.
Hagen, J.O., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.313-328, 15 refs.
Lefauconnier, B., Liestöl, O.
Glacier mass balance, Glacier ablation, Glacier melting, Glacier surveys, Radiation, Norway—Svalbard.

46-4632
Heat and mass exchange processes in the glacial systems of the Central Tien Shan.
Alzin, V.B., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.329-335, 10 refs.
Loktionova, E.M., Nesterov, V.N., Sexton, D.D.
Glacier heat balance, Glacier mass balance, Glacier thickness, Snowmelt, Mass transfer, Heat transfer, USSR—Tien Shan.

46-4633
Impact of middle troposphere temperature on the regime of glaciation: a case of Central Asia.
Ni, A.A., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.337-344, 4 refs.
Tikhanovskaia, A.A., Volkova, M.V.
Glaciation, Temperature variations, Air temperature, Temperature effects.

46-4634
Kinematics of the surface of a surging glacier (comparison of the Medvezhiy and Variegated Glaciers).
Osipova, G.B., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.345-357, 11 refs.
Tsvetkov, D.G.
Glacier surfaces, Glacier surges, Glacier oscillation, Glacier alimentation, Velocity.

46-4635
Methods for computing the onset date and daily discharge hydrography of the outburst from Mertzbacher Lake, Northern Inylchek Glacier, Tien Shan.
Konovalov, V.G., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.359-366, 2 refs.
Glacial lakes, Hydrography, Mathematical models, Flood forecasting, Meltwater, USSR—Tien Shan.

46-4636
Some characteristics of the external glacier mass balance of South America.
Kadomtseva, T.G., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.367-376, 19 refs.
Glacier mass balance, Glacier ablation, Glacier alimentation, Mapping, Climatic factors.

46-4637
Role of ruggedness in the energy balance of the surfaces of mountain massifs.
Shmakin, A.B., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.377-384, 8 refs.
Ananicheva, M.D.
Mountains, Mathematical models, Radiation, Heat balance, Heat flux, Glacier melting.

46-4638
Variations and interrelations between helio-geophysical characteristics.
Berri, B.I., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.385-394, 12 refs.
Geophysical surveys, Avalanche mechanics, Runoff, Age determination, Analysis (mathematics), Glacier oscillation, Correlation.

46-4639
Glacial events in the Tien Shan Mountains and long-range correlation.
Mel'nikova, A.P., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.397-403, 27 refs.
Bakov, E.K.
Palynology, Paleoclimatology, Correlation, Cooling, Glaciation, Moraines, Humidity, USSR—Tien Shan.

46-4640
On late Quaternary glaciation of the foothill area of the East Kunlun Mountains, West China.
Drozdowski, E., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.405-413, 16 refs.
Terraces, Quaternary deposits, Pleistocene, Glaciation, Paleoclimatology, China—Kunlun Mountains.

46-4641
Pleistocene glaciation of Siberian mountains and atmospheric circulation.
Sheinkman, V.S., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.415-423, 24 refs.
Barashkova, N.K.
Pleistocene, Glaciation, Mountains, Atmospheric circulation, Paleoclimatology, Age determination, USSR—*Siberia*.

46-4642
Pleistocene glaciation of Tibet.
Kuhle, M., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.425-438, 34 refs.
Pleistocene, Glaciation, Paleoclimatology, Moraines, Tibet.

46-4643
Causes and climatic consequences of non-equilibrium heat exchange between freezing water and the environment.
Faĭko, L.I., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.441-446, 6 refs.
Air water interactions, Heat transfer, Soil freezing, Heat balance, Climate.

46-4644
Free-drifting icebergs and thermohaline structure.
Pisarevskaia, L.G., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.447-454, 15 refs.
Popov, I.K.
Icebergs, Heat flux, Ice water interface, Salinity, Water temperature, Ice melting, Fluid dynamics, Ocean waves.
During three expeditions, temperature and salinity measurements around tree drifting icebergs were made in the Arctic and the Antarctic. Relevant information on fluid dynamics applied to the isopycnal structure typical of the studied icebergs suggests that the interaction of a moving iceberg with the oceanic stratification leads to internal wave generation. Wave-induced Kelvin-Helmholtz instability and turbulent mixing may affect the ocean heat flux. (Auth.)

46-4645
On the origin of cross-bars at the mouth of fjords and troughs.
Bakov, E.K., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.455-462, 31 refs.
Bottom topography, Glacial erosion, Glacier alimentation, Moraines, Bedrock.

46-4646
Thermodynamic properties of ice, water and their mixture under high pressure.
Chizhov, V.E., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.463-470, 13 refs.
Nagornov, O.V.
Ice water interface, Thermodynamic properties, Ice melting, Analysis (mathematics), Pressure

46-4647
Role of sea ice in the system of interaction media in the Southern polar region.
Romanov, A.A., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.471-477, 18 refs.
Korotkov, A.I.
Sea ice, Ice cover, Polynyas.
The concept of antarctic ice cover evolution is formulated. Periods of two or three years prevail in the year-to-year variations of ice coverage in the southern ocean. The intra-Antarctic, an energy-active zone formed by recurring polynyas, is one of the generators of ice cover extent variations. (Auth.)

46-4648
Study of the greenhouse effect on the antarctic ice cap.
Arapov, P.P., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.481-487, 4 refs.
Krigel', A.M., Odintsov, V.A.
Solar radiation, Ice heat flux, Heat balance, Mathematical models, Heat transfer coefficient, Antarctica—Vostok Station.
The significant influence of solar radiation on the thermal conditions of ice near Vostok Station was studied, using both direct measurements and numerical simulation. From this the greenhouse effect of solar radiation on ice, diurnal variations of heat flux at different depths, as well as heat balance components on an ice surface, were estimated. (Auth.)

46-4649
Effect of snow drifting on large-scale aridization.
Diunin, A.K., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.489-494, 9 refs.
Kvon, IA.D., Zhilin, A.M., Komarov, A.A.
Snowdrifts, Snowstorms, Snow cover effect, Snow evaporation, Wind factors, Analysis (mathematics), Countermeasures.

46-4650
Effect of snow/ice-cloud radiative interaction on the global solar radiation at the surface of snow and ice masses.
Ohata, T., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.495-506, 16 refs.
Solar radiation, Albedo, Snow air interface, Ice air interface, Reflection, Cloud cover, Analysis (mathematics), China—Kunlun Mountains.

46-4651
Fluctuations of glaciers of the Ak-Shyirak Ridge from 1943 to 1977.
Kuz'michenok, V.A., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.507-513.
Glacier oscillation, Mapping, Computer applications.

46-4652
Formation of the thermal regime of subpolar glaciers *under climate change.*
Krass, M.S., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.515-525, 6 refs.
Larina, T.B., Macheret, IU.IA.
Climatic factors, Climatic changes, Glaciers, Glacier melting, Thermal regime, Mathematical models.

46-4653
Ice sheets and atmospheric CO2.
Losev, K.S., *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.527-528, 3 refs. Extended abstract.
Ice sheets, Carbon dioxide, Ice cover, Ice air interface.
A hypothesis is proposed which is an attempt to explain the rapid disintegration of the last glaciation followed by a very warm climate optimum.

46-4654
Numerical estimation of the fields of meteorological elements in mountains for glaciation regime computations.
Konovalov, V.G., et al, *IAHS publication*, 1991, No.208, Glaciers-ocean-atmosphere interactions. Edited by V.M. Kotliakov, A. Ushakov, and A. Glazovskiĭ, p.529-541, 4 refs.
Karandaeva, L.M., Ratsek, I.V.
Analysis (mathematics), Air temperature, Forecasting, Humidity, Insolation, Solar radiation, Meteorological data, Snow melting, Ice melting

46-4655
Parametrization of turbulent transfers between glaciers and the atmosphere.
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Mathematical models, Snowmelt, Ice air interface, Turbulent exchange, Turbulent flow, Snow hydrology, Snow depth.

46-4656
Abandonment of the term 'periglacial'.
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DLC QE993.P28
Periglacial processes.

46-4657
Network analysis of the city snow removal system.
Sugimori, M., *Seppyo*, Mar. 1992, 54(1), p.1-9, In Japanese with English summary. 4 refs.
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46-4658
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46-4659
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46-4660
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Nishimura, K., Maeno, N.
Snowdrifts, Wind erosion, Sastrugi, Snow erosion, Snow surface, Wind tunnels, Mathematical models.

46-4661
Snowcover data of Nagaoka City.
Ikarashi, T., et al, *Seppyo*, Mar. 1992, 54(1), p.35-39, In Japanese. 2 refs.
Hayakawa, N., Kaneko, S.
Snow accumulation, Meteorological data, History, Japan—Nagaoka.

46-4662
Radiometric characteristics of snow in microwave frequency band.
Igarashi, T., *Seppyo*, Mar. 1992, 54(1), p.41-48, In Japanese. 15 refs.
Snow surveys, Snow depth, Snow water equivalent, Snow electrical properties, Radiometry, Microwaves.

46-4663
Promise of satellite remote sensing on snow and ice studies.
Nishio, F., *Seppyo*, Mar. 1992, 54(1), p.50-54, In Japanese. 6 refs.
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46-4664
Glaciological information revealed by remote sensing.
Takahashi, S., *Seppyo*, Mar. 1992, 54(1), p.54-56, In Japanese. 3 refs.
Glacier surveys, Ice surveys, Snow surveys, Global change, Remote sensing, Spaceborne photography.

46-4665
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Ice surveys, Sea ice, Global change, Remote sensing, Spaceborne photography.

46-4666
Role of the cryosphere over Eurasia on the global climate system.
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46-4667
Perspective for snow and ice studies by satellite in hydrologic cycle on the Earth.
Koike, T., *Seppyo*, Mar. 1992, 54(1), p.63-64, In Japanese.
Ice surveys, Snow surveys, Hydrologic cycle, Remote sensing, Spaceborne photography.

46-4668
Proposal for snow and ice studies using satellite technique with GIS.
Aniya, M., *Seppyo*, Mar. 1992, 54(1), p.65-66, In Japanese. 3 refs.
Ice surveys, Snow surveys, Data processing, Remote sensing, Spaceborne photography.

46-4669
Perspective of satellite glaciology.
Ono, N., *Seppyo*, Mar. 1992, 54(1), p.66-67, In Japanese. 2 refs.
Ice surveys, Snow surveys, Remote sensing, Spaceborne photography.

46-4670
Wind tunnel study of wind loads on and snowdrift around the buildings for antarctic use.
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Kwok, K.C.S., Rohde, H.F.
Wind pressure, Buildings, Cold weather construction, Snowdrifts, Wind tunnels, Antarctica.
The design features affecting the performance of antarctic buildings in terms of snowdrift clearance and design loading appear to be the building shape facing the wind and the elevation of the building from the ground. The wind induced loads on and snowdrifting formation around a number of different shapes of on-ground and elevated buildings were investigated. It is recommended that buildings have chamfered corners and be raised above ground as high as practicable, and the entrance not be facing the wind. (Auth. mod.)

46-4671
Wind tunnel test of wind loads on various shapes of elevated buildings for antarctic use.
Kim, D.H., et al, *Sydney University, Australia. School of Civil and Mining Engineering. Research report*, Mar. 1990, R-608, 40p., PB90-259318, 18 refs. For another version see 46-3023 or G- 45970.
Kwok, K.C.S., Rohde, H.F.
Wind pressure, Buildings, Cold weather construction, Modular construction, Snowdrifts, Wind tunnels, Antarctica.
Wind loads on elevated modular buildings in Antarctica were simulated on 1:50-scale models in the Boundary Layer Wind Tunnel at the School of Civil and Mining Engineering, Sydney University, Australia. The modular building system is based on the dimensions of a shipping container, 6 x 3.6 x 4 m. Models with chamfered and rounded corners show a reduction in wind force over a simple rectangular shape. (Auth. mod.)

46-4672
Numerical flow model of the Taku Glacier, Alaska.
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46-4673
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46-4674
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46-4675
Effects of mineral by-products on the frost-resistance of concrete.
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46-4676
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Riska, K., et al, *Helsinki University of Technology. Laboratory of Naval Architecture and Marine Engineering. Report*, 1990, M-96, 141p. + appends., PB90-249954, 3 refs. For Vol.2 see 46-332.
Kämäräinen, J., Hänninen, M.
Ice navigation, Ice loads, Ships, Ice breaking, Ice solid interface, Metal ice friction, Impact tests, Mathematical models.

46-4677
Full scale observations of ship-ice contact: results from tests series onboard IB *SAMPO*, winter 1989.
Riska, K., et al, *Helsinki University of Technology. Laboratory of Naval Architecture and Marine Engineering. Report*, 1990, M-97, 54p. + appends., PB90-249962, 6 refs.
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Ice navigation, Icebreakers, Ice breaking, Ice loads, Ice solid interface, Metal ice friction, Ice pressure, Impact tests.

46-4678
Results from tests on extrusion of crushed ice.
Tuhkuri, J., et al, *Helsinki University of Technology. Laboratory of Naval Architecture and Marine Engineering. Report*, 1990, M-98, 79p., PB90-249970, 8 refs.
Riska, K.
Ice breaking, Ice pressure, Ice strength, Ice loads, Ice solid interface, Strain tests, Mathematical models.

46-4679
Research into a theoretical equation for frost heave.
Isaacs, R.M., *U.S. National Science Foundation. Division of Industrial Science and Technological Innovation. Report, 1988, NSF/ISI-88012, 118p., PB90-262130*, 27 refs.
Frost heave, Soil freezing, Soil tests, Soil temperature, Thermistors.

46-4680
Soil moisture sensor for use in polar regions.
Serati, S.A., et al, *U.S. National Science Foundation. Division of Industrial Science and Technological Innovation. Report*, 1988, NSF/ISI-88007, 33p., PB90-262205, 18 refs.
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Soil water, Moisture meters, Unfrozen water content, Moisture detection, Ice detection, Permafrost indicators.

46-4681
Estimates of slope retreat around the Ivory Glacier catchment, South Island, New Zealand.
Birnie, R.V., *New Zealand geographer*, Apr. 1992, 48(1), p.37-42, 20 refs.
Slope stability, Slope processes, Glacier ablation, New Zealand—Ivory Glacier.

46-4682
Heterogeneous reaction of HOCl+HCl (reaction) HCl2+H2O on ice and nitric acid trihydrate: reaction probabilities and stratospheric implications.
Abbatt, J.P.D., et al, *Geophysical research letters*, Mar. 3, 1992, 19(5), p.461-464, 20 refs.
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46-4683
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Burk, S.D.
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46-4684
Performance degradation due to hoar frost on lifting surfaces.
Kind, R.J., et al, *Canadian aeronautics and space journal*, June 1992, 38(2), p.62-70, 17 refs
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Aircraft icing, Surface roughness, Ice accretion, Hoarfrost, Ice cover effect, Performance, Ice air interface, Turbulent boundary layer, Wind tunnels, Laminar flow.

46-4685
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Avalanches, Safety, Warning systems, Accidents, Monitors, Meteorological data, Avalanche forecasting.

46-4686
Differentiation and alteration of materials in the active layer of patchy tundra on the southwest Taymyr Peninsula.
Grabetskaia, N.A., et al, *Soviet soil science*, July 1992, 23(10), p.38-54, Translated from Pochvovedenie, 1991, No.4. 24 refs.
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Tundra, Soil physics, Active layer, Geocryology, Lithology, Soil formation, Mineralogy, Mass transfer, Microanalysis, Particle size distribution.

46-4687
Characteristics of the organic matter of cryogenic soils.
Chimitdorzhieva, G.D., *Soviet soil science*, July 1992, 23(10), p.68-76, Translated from Pochvovedenie, 1991, No.11. 6 refs.
Geocryology, Chernozem, Soil formation, Soil composition, Organic soils, Chemical analysis, Permafrost transformation, Decomposition, Agriculture.

46-4688
55 T long pulse magnet reinforced by ice and woven-glass cloths.
Takeyama, S., et al, *Measurement science and technology*, July 1992, 3(7), p.662-666, 10 refs.
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Electric fields, Electromagnetic properties, Design, Electrical insulation, Ice (construction material), Ice cover effect, Electrical resistivity, Ice electrical properties.

46-4689
Features of the lithogenesis of deposits of the mountain glaciation subformation of Zailiyskii Alatau.
Shipulina, V.G., et al, *Soviet engineering geology*, 1991, No.4, p.1-11, 19 refs. For Russian original see 46-2847.
Engel's, A.A.
Glaciation, Mountain glaciers, Glacial deposits, Lithology, Mudflows, Glacial geology, Geologic structures, Engineering geology.

46-4690
Complexes of cryogenic processes and formations on the Tazov Peninsula and prognostic evaluation of their development.
Garagulia, L.S., et al, *Soviet engineering geology*, 1991, No.4, p.24-34, 10 refs. For Russian original see 46-2848.
Ruzhanskii, V.E.
Geocryology, Cryogenic structures, Classifications, Landforms, Quaternary deposits, Engineering geology, Frozen rock temperatures.

46-4691
Contribution toward understanding the biospherical significance of antarctic ozone depletion.
Lubin, D., et al, *Journal of geophysical research*, May 30, 1992, 97(D8), p.7817-7828, 42 refs.
Polar atmospheres, Atmospheric density, Ozone, Ultraviolet radiation, Environmental impact, Radiance, Ecosystems, Plankton, Radiometry, Antarctica—Palmer Station
Measurements of biologically active UV radiation made by the National Science Foundation (NSF) scanning spectroradiometer (UV-monitor) at Palmer Station during the austral springs of 1988, 1989, and 1990 are presented and compared. Column ozone abundance above Palmer Station is computed from these measurements using a multiple wavelength algorithm. Two contrasting action spectra (biological weighting functions) are used to estimate the biologically relevant dose from the spectral measurements: a standard weighting function for damage to DNA, and a new action spectrum representing the potential for photosynthesis inhibition in antarctic phytoplankton. The severe ozone holes of 1989 and 1990, in which the ozone abundance regularly fell below 200 DU (Dobson units), brought about increases in UV surface irradiance weighted by either action spectrum. Ozone abundances and dose-weighted irradiances provided by the NSF UV-monitor are used to derive the radiation amplification factors (RAFs) for both DNA-effective irradiance and phytoplankton-effective irradiance. The

RAF for DNA-effective irradiance is nonlinear in ozone abundance and is in excess of the popular "two for one" rule, while the RAF for phytoplankton-effective irradiance approximately follows a "one for one" rule. (Auth. mod.)

46-4692
Ultraviolet radiation in the Arctic: the impact of potential ozone depletions and cloud effects.
Tsay, S.C., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.7829-7840, 48 refs.
Stamnes, K.
Polar atmospheres, Ozone, Atmospheric density, Photochemical reactions, Ultraviolet radiation, Aerosols, Cloud physics, Climatic changes, Heating, Radiation absorption.

46-4693
Radiative effects of polar stratospheric clouds during the Airborne Antarctic Ozone Experiment and the Airborne Arctic Stratospheric Expedition.
Rosenfield, J.E., *Journal of geophysical research*, May 30, 1992, 97(D8), p.7841-7858, 53 refs.
Polar atmospheres, Ozone, Aerosols, Cloud physics, Radiation absorption, Chemical properties, Radiation balance, Heating, Aerial surveys, Air temperature.
Daily, three dimensional fields of both Type I nitric acid trihydrate (NAT) and Type II water ice polar stratospheric clouds (PSCs) have been generated in the polar regions during the period of the Airborne Antarctic Ozone Experiment (AAOE) and the Airborne Arctic Stratospheric Expedition (AASE) aircraft missions. Mission data on particulate composition and size, together with National Meteorological Center (NMC) analyzed temperatures, have been used. Mie theory and a radiative transfer model were used to compute the radiative heating rates during the mission periods, for clear and cloudy lower sky cases. Only the Type II water ice clouds have a significant radiative effect, with the Type I NAT PSCs generating a net heating or cooling of 0.1 K/d or less. The major effect of PSCs during AAOE appears to be one of net heating, with maximum heating rates as large as 0.5 K/d for particular days. Heating rates of 0.5 K/d or greater were computed during the periods of Sep. 1-6 and Sep. 11-14. This additional heating was generally found over the western part of Antarctica and near the coastal regions, while a small cooling was computed over the Antarctic Plateau. On the whole, the radiative effects of PSCs appear to be too small to have an appreciable impact on vertical motions except over time scales of a few days during AAOE. This result makes it unlikely that the radiative-dynamical mechanisms proposed for the antarctic ozone depletion play any significant role. (Auth. mod.)

46-4694
Structure of the polar vortex.
Schoeberl, M.R., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.7859-7882, 69 refs.
Lait, L.R., Newman, P.A., Rosenfield, J.E.
Polar atmospheres, Atmospheric physics, Ozone, Air temperature, Atmospheric circulation, Chemical properties, Heating, Radiation balance, Aerial surveys.
Reconstruction of the Airborne Antarctic Ozone Experiment and Airborne Arctic Stratosphere Expedition aircraft constituent observations, radiative heating rate computations, and trajectory calculations are used to generate comparative pictures of the 1987 Southern Hemisphere (SH) late winter and 1989 Northern Hemisphere (NH) mid-winter lower stratospheric polar vortices. Overall, both polar vortices define a region of highly isolated air, where the exchange of trace gases occurs principally at the vortex edge through erosional wave activity. Aircraft measurement showed that (1) between 50 and 100 mbar, horizontally stratified long-lived tracers such as N2O are displaced downward 2-3 km on the cyclonic (poleward) side of the jet, with the meridional tracer gradient sharpest at the jet core. (2) Eddy mixing rates, computed using parcel ensemble statistics, are an order of magnitude or more lower on the cyclonic side of the jet compared to those on the anticyclonic side. (3) Poleward zonal mean meridional flow on the anticyclonic side of the jet terminates in a descent zone at the jet core. Despite the similarities between the SH and NH winter vortices, there are important differences. During the aircraft campaign periods, the SH vortex jet core was located roughly 8-10 deg equatorward of its NH counterpart after pole centering. As a result of the larger size of the SH vortex, the dynamical heating associated with the jet core descent zone is displaced further from the pole. The SH polar vortex can therefore approach radiative equilibrium temperatures over a comparatively larger area than the NH vortex. The subsequent widespread formation of polar stratospheric clouds within the much colder SH vortex core gives rise to the interhemispheric differences in the reconstructed H2O, NOy, ClO, and O3 species which are affected by polar stratospheric clouds. (Auth. mod.)

46-4695
Polar stratospheric cloud processed air and potential vorticity in the Northern Hemisphere lower stratosphere at mid-latitudes during winter.
Tuck, A.F., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.7883-7904, 44 refs.
Polar atmospheres, Stratosphere, Atmospheric circulation, Atmospheric density, Ozone, Chemical properties, Air masses, Aerial surveys, Nucleation, Clouds (meteorology).

46-4696
Photochemical partitioning of the reactive nitrogen and chlorine reservoirs in the high-latitude stratosphere.
Kawa, S.R., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.7905-7923, Refs. p.7921-7923.
Polar atmospheres, Ozone, Photochemical reactions, Atmospheric circulation, Stratosphere, Chemical properties, Correlation, Sampling, Nucleation.
Partitioning of the major components of the reactive nitrogen and inorganic chlorine reservoirs is derived from aircraft measurements in the lower stratosphere during the winter season in both hemispheres at latitudes of about 60-80 deg. The goal of this work is to exercise the power of the correlated set of measurements from polar missions of the NASA ER-2 aerial surveys to amplify the individual measurements. The results provide a consistent method for comparing distributions, and hence the controlling processes, between different areas of the near-polar regions. The analysis provides clear evidence of the effects of heterogeneous processes in the atmosphere. The resulting latitude distributions in the Arctic outside the vortex agree reasonably well with predictions of a two-dimensional photochemical model, indicating that partitioning in this region is largely controlled by standard homogeneous gas phase chemistry. The partitioning in the Antarctic suggests that nearly the entire range of latitudes sampled by the ER-2 is affected by heterogeneous processes *in situ*, including that portion of the "collar" region equatorward of the nominal chemically perturbed region (CPR). Consideration of heterogeneous processing in the region outside the CPR is important in predicting the possible expansion of antarctic ozone depletion and the transport of chemically perturbed air to lower latitudes. (Auth. mod.)

46-4697
Arctic polar stratospheric cloud aerosol: aircraft measurements of reactive nitrogen, total water, and particles.
Kawa, S.R., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.7925-7938, 52 refs.
Polar atmospheres, Cloud physics, Aerosols, Chemical properties, Nucleation, Atmospheric composition, Aerial surveys, Particle size distribution, Stratosphere.

46-4698
Composition measurements of the 1989 arctic winter stratosphere by airborne infrared solar absorption spectroscopy.
Toon, G.C., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.7939-7961, 35 refs.
Polar atmospheres, Atmospheric density, Ozone, Atmospheric composition, Infrared spectroscopy, Solar radiation, Chemical properties, Aerial surveys, Photochemical reactions, Stratosphere.

46-4699
Evidence for subsidence in the 1989 arctic winter stratosphere from airborne infrared composition measurements.
Toon, G.C., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.7963-7970, 17 refs.
Polar atmospheres, Atmospheric composition, Stratosphere, Atmospheric density, Atmospheric circulation, Chemical properties, Infrared reconnaissance, Aerial surveys.

46-4700
Seasonal variations in antarctic NOx chemistry.
Solomon, S., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.7971-7978, 43 refs.
Keys, J.G.
Polar atmospheres, Atmospheric composition, Stratosphere, Air pollution, Photochemical reactions, Chemical properties, Seasonal variations, Ozone, Aerosols.
Measurements of NO2 from two sites in the Antarctic are compared with model calculations that include a detailed treatment of diurnal NOx chemistry for fall, winter, and spring. Observed slant column amounts in spring provide strong evidence for important heterogeneous effects, probably through polar stratospheric cloud chemistry. It is shown that the slow growth of NO2 column observed during September is consistent with release of NO2 from N2O5 formed above the altitudes where polar stratospheric clouds occur. The observed early fall column amounts are in good agreement with model calculations, and the sharp onset of diurnal variation in column NO2 obtained near day 57 is well simulated. Following this period, gas-phase model calculations suggest that N2O5 will rapidly accumulate during the antarctic fall as nights become longer. It is suggested that the high-latitude fall period during which N2O5 grows rapidly represents an optimum time to search for evidence of possible heterogeneous chemistry on background aerosols. (Auth. mod.)

46-4701
Episodic total ozone minima and associated effects on heterogeneous chemistry and lower stratospheric transport.
Rood, R.B., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.7979-7996, 38 refs.
Polar atmospheres, Atmospheric density, Ozone, Atmospheric circulation, Chemical properties, Heterogeneous nucleation, Simulation, Stratosphere, Climatic factors.

46-4702
Stratospheric sulfate aerosol in and near the Northern Hemisphere polar vortex: the morphology of the sulfate layer, multimodal size distributions, and the effect of denitrification.
Wilson, J.C., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.7997-8013, 49 refs.
Polar atmospheres, Aerial surveys, Atmospheric composition, Stratosphere, Chemical properties, Aerosols, Condensation nuclei, Air pollution, Sampling, Particle size distribution.

46-4703
Particle size distributions in arctic polar stratospheric clouds, growth and freezing of sulfuric acid droplets, and implications for cloud formation.
Dye, J.E., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.8015-8034, 59 refs.
Polar atmospheres, Cloud physics, Cloud droplets, Particle size distribution, Freezing points, Condensation nuclei, Chemical properties, Ozone, Cooling rate, Stratosphere.

46-4704
Interpretation of measurements made by the forward scattering spectrometer probe (FSSP-300) during the Airborne Arctic Stratospheric Expedition.
Baumgardner, D., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.8035-8046, 16 refs.
Dye, J.E., Gandrud, B.W., Knollenberg, R.G.
Polar atmospheres, Stratosphere, Aerosols, Spectrometers, Probes, Particle size distribution, Aerial surveys, Lasers, Ozone, Scattering.

46-4705
Twilight variation of vertical column abundances of OClO and BrO in the north polar region.
Wahner, A., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.8047-8055, 25 refs.
Schiller, C.
Polar atmospheres, Air pollution, Stratosphere, Chemical properties, Diurnal variations, Atmospheric composition, Sampling, Aerial surveys, Ozone.

46-4706
***Influence* of surface kinetics on the growth of stratospheric ice crystals.**
MacKenzie, A.R., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.8057-8064, 38 refs.
Haynes, P.H.
Stratosphere, Ice models, Cloud physics, Condensation nuclei, Ice crystal growth, Chemical properties, Heterogeneous nucleation, Surface properties, Ozone.

46-4707
Characterization of model polar stratospheric cloud films using Fourier transform infrared spectroscopy and temperature programmed desorption.
Koehler, B.G., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.8065-8074, 15 refs.
Middlebrook, A.M., Tolbert, M.A.
Cloud physics, Hydrates, Ice spectroscopy, Films, Radiation absorption, Chemical composition, Simulation, Spectra, Ozone, Infrared absorption.

46-4708
Global ozone depletion and the antarctic ozone hole.
Pitari, G., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.8075-8082, 27 refs.
Visconti, G., Verdecchia, M.
Polar atmospheres, Global change, Ozone, Cloud physics, Heterogeneous nucleation, Chemical properties, Atmospheric attenuation, Mathematical models, Climatic factors, Weather forecasting.
The secular trend of the antarctic ozone hole has been studied with a two-dimensional model which can simulate formation of polar stratospheric clouds and includes heterogeneous chemical reactions. Results from the numerical simulation have been validated by comparison with available experimental data. Trends up to the year 2010 using standard (i.e., homogeneous) and heterogeneous chemistry have been compared, and show that global ozone depletion reached 5-6% in the last 30 years and will average 8% for the next 20 years. Subtracting a 2% loss due to standard chemistry in the presence of trace gas increase in the last 30 years, the authors find a 3-4% global ozone loss due to heterogeneous chemistry. The depletion is evident even outside the Southern Hemisphere spring season and at mid-latitudes, pointing to an increase in global ozone sink. (Auth. mod.)

46-4709
Analysis of the ozone soundings made during the first quarter of 1989 in the Arctic.
Kyrö, E., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.8083-8091, 12 refs.
Polar atmospheres, Atmospheric composition, Atmospheric density, Ozone, Sounding, Air temperature, Meteorological data, Temperature distribution, Stratification.

46-4710
Two years of regular ozone soundings in the European Arctic, Sodankylä.
Taalas, P., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.8093-8098, 13 refs.
Kyro, E.
Polar atmospheres, Atmospheric composition, Ozone, Atmospheric density, Sounding, Air temperature, Periodic variations, Correlation, Stratosphere.

46-4711
Observations of ozone and polar stratospheric clouds at Heiss Island during winter 1988-1989.
Rosen, J.M., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.8099-8104, 19 refs.
Polar atmospheres, Atmospheric composition, Atmospheric density, Ozone, Cloud physics, Sounding, Aerosols, Stratosphere, Periodic variations.

46-4712
Case of Type I polar stratospheric cloud formation by heterogeneous nucleation.
Pueschel, R.F., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.8105-8114, 39 refs.
Polar atmospheres, Atmospheric composition, Cloud physics, Heterogeneous nucleation, Aerosols, Chemical properties, Sampling, Aerial surveys, Stratosphere, Ozone.

46-4713
Variations of stratospheric ozone concentrations above Spitsbergen in summer 1989.
Laurila, T., et al. *Journal of geophysical research*, May 30, 1992, 97(D8), p.8115-8126, 29 refs.
Hakola, H., Junila, P., Joffre, S.M.
Polar atmospheres, Atmospheric composition, Sounding, Atmospheric density, Wind factors, Ozone, Stratosphere, Advection, Periodic variations.

46-4714
Impact of recent total ozone changes on tropospheric ozone photodissociation, hydroxyl radicals, and methane trends.
Madronich, S., et al. *Geophysical research letters*, Mar. 3, 1992, 19(5), p.465-467, 23 refs.
Granier, C.
Ozone, Atmospheric composition.
Trends in total atmospheric ozone from 1979-1989 were analyzed to derive the corresponding changes in the tropospheric photodissociation rate coefficient $J1$ for the reaction $O_3 + h\nu$ (*lambda* < 330 nm) reaction $O2 + O(1D)$. Zonally and annually integrated trends in $J1$ are +3.8% per decade in the Northern Hemisphere and 4.1% per decade in the Southern Hemisphere. Changes in (OH) due to the $J1$ trends may have contributed to the slowing of atmospheric methane increases observed in recent years. (Auth.)

46-4715
Chromatographic analysis of reduced sulfur gases in antarctic waters following pre-concentration onto Tenax.
Shooter, D., et al. *International journal of environmental analytical chemistry*, 1992, 47(4), p.239-249, 22 refs.
Geochemistry, Gases, Glacier ice, Sea ice, Meltwater, Chemical composition, Sampling, Sea water, Laboratory techniques, Antarctica—McMurdo Ice Shelf.
A technique was developed using sparging and pre-concentration onto a Tenax trap at ambient temperature, allowing field measurements to be made of reduced sulfur gases in antarctic marine and glacial melt waters. Following thermal desorption, gases were determined by gas chromatography using a flame photometric detector. Detection limits in ng/l were H2S 50, OCS 8, SO2 160, CH3SH 6, CH3SCH3 20 and CS2 2. Storage of melt water samples for more than 24 hours resulted in concentration changes of the reduced sulfur gases present. While the antarctic environment imposed limitations on the analytical method, an investigation of various pond and marine waters was undertaken. (Auth. mod.)

46-4716
Past, present and future KOSI comet simulation experiments.
Girün, E., et al. *Annales Geophysicae*, Mar.-Apr. 1992, 10(3-4), International Workshop on Modelling, Simulation and Sounding of Cometary Nuclei, Cagliari, Italy, May 28-30, 1991. Selected papers, p.190-197, 25 refs.
Benkhoff, J., Gebhard, J.
Extraterrestrial ice, Simulation, Regolith, Insolation, Ice sublimation, Vapor transfer, Porous materials, Surface properties.

46-4717
Cometary analogue material: types, tests, and results.
Stöffler, D., et al. *Annales geophysicae*, Mar.-Apr. 1992, 10(3-4), International Workshop on Modelling, Simulation and Sounding of Cometary Nuclei, Cagliari, Italy, May 28-30, 1991. Selected papers, p.206-216, 51 refs.
Düren, H.
Extraterrestrial ice, Snow mechanics, Simulation, Regolith, Porous materials, Physical properties, Thermal conductivity, Snow thermal properties.

46-4718
***Ab initio* studies on high pressure phases of ice.**
Lee, C., et al. *Physical review letters*, July 20, 1992, 69(3), p.462-465, 22 refs.
Ice physics, Ice structure, High pressure ice, Phase transformations, Hydrogen bonds, Molecular energy levels, Molecular structure, Protons.

46-4719
Effects of terrain on excessive travel distance by snow avalanches.
Butler, D.R., et al. *Northwest science*, May 1992, 66(2), p.77-85, 36 refs.
Malanson, G.P.
Avalanche mechanics, Avalanche erosion, Avalanche tracks, Mass flow, Topographic effects, Internal friction, Geomorphology, Slope orientation, Safety.

46-4720
Determination of methane concentration in air extracted from antarctic ice core samples.
Tohjima, Y., et al. *Chemical Society of Japan. Bulletin*, Nov. 1991, 64(11), p.3457-3459, 15 refs.
Tominaga, T., Makide, Y., Fujii, Y.
Ice cores, Ice sheets, Ice sampling, Natural gas, Atmospheric composition, Bubbles, Laboratory techniques, Hydrocarbons, Antarctica—Mizuho Station.
A convenient method was developed for determination of methane concentration in old air trapped in antarctic ice core samples. The air was extracted with a stainless steel bellows pump after quick refreezing of melted ice samples, and the methane was measured with a gas chromatograph with a flame ionization detector. The averaged methane concentration in the Mizuho ice core at a depth of 330 m (ca. 3600 BP, 11 samples) was 750 +/- 20 ppbv. (Auth. mod.)

46-4721
Frozen start-up behavior of low-temperature heat pipes.
Faghri, A., *International journal of heat and mass transfer*, July 1992, 35(7), p.1681-1694, With French, German and Russian summaries. 14 refs.
Heat pipes, Pipe flow, Performance, Freezeup, Heating, Countermeasures, Heat transfer, Liquid phases, Temperature effects, Fluid dynamics, Mathematical models.

46-4722
Temperature dependence of beam scattering in young sea ice.
Voss, K.J., et al. *Applied optics*, June 20, 1992, 31(18), p.3388-3389, 3 refs.
Schoonmaker, J.S.
Sea ice, Ice optics, Optical properties, Light scattering, Radiance, Temperature effects, Diffusion, Remote sensing.

46-4723
Midwinter weight gain of excised white spruce *branchlets at the northern tree line.*
Scott, P.A., et al. *Canadian journal of forestry research*, Apr. 1992, 22(4), p.625-627, With French summary. 13 refs.
Hansell, R.I.C.
Forestry, Blowing snow, Trees (plants), Damage, Desiccation, Forest lines, Cold weather survival, Humidity, Abrasion, Growth.

46-4724
Estimation of ice cloud parameters from ground-based infrared radiometer and radar measurements.
Matrosov, S.Y., et al. *Journal of geophysical research*, July 20, 1992, 97(D11), p.11,567-11,574, 22 refs.
Uttal, T., Snider, J.B., Kropfli, R.A.
Cloud physics, Remote sensing, Ice crystal optics, Radiometry, Thermal radiation, Particle size distribution, Microstructure, Climatic factors, Radar echoes, Atmospheric density.

46-4725
Comparison of major chemical species seasonal concentration and accumulation at the South Pole and Summit, Greenland.
Whitlow, S., et al. *Atmospheric environment*, Aug. 1992, 26A(11), p.2045-2054, 57 refs.
Mayewski, P.A., Dibb, J.E.
Snow composition, Correlation, Sampling, Chemical properties, Atmospheric composition, Aerosols, Atmospheric circulation, Seasonal variations, Ion density (concentration), Antarctica—Amundsen-Scott Station.
High-resolution snow chemistry records have been recovered from a site close to the South Pole covering the period 1955-1989, and from Summit, Greenland for the periods 1979-1987 and 1259-1989. The seasonal variation of the major ions relative to *Delta*O-18 and their average yearly fluxes are compared for the two sites. Comparisons are also made to limited available aerosol data. Gaseous species and some species with gaseous precursors (NO3, NH4 and excess Cl) have similar timings in South Pole and pre-1900 Summit snow. Timing of non-sea-salt (nss) SO4 and species that are generated as marine and crustal aerosols (Na, nss Mg and nss Ca) differ between the two sites. The timing of nss SO4 and NO3 is complicated in recent precipitation at Summit, Greenland, by the impact of anthropogenic emissions. Fluxes of sea-salt species, nss SO4 and NO3 (pre-1900 values for Summit) are less than a factor of 2 higher at Summit. Species with a *continental source*, nss K, nss Mg, nss Ca and NH4 are more than five-fold higher at Summit. (Auth. mod.)

46-4726
Motion of CH4 molecules in D2O clathrate from incoherent inelastic neutron scattering.
Sears, V.F., et al. *Physica B*, 1992, Vol.180-181(Pt.B), International Conference on Neutron Scattering, Oxford, U.K., Aug. 27-30, 1991. Proceedings. Edited by K.A. McEwen et al, p.658-660, 8 refs.
Clathrates, Hydrates, Deuterium oxide ice, Ice spectroscopy, Neutron scattering, Molecular energy levels, Molecular structure, Orientation, Low temperature research, Temperature effects.

46-4727
Ice tracking techniques, implementation, performance, and applications.
Rothrock, D.A., et al. *Advances in space research*, July 1992, 12(7), Committee on Space Research Plenary Meeting, 28th, Symposium 2, Hague, Netherlands, June 25-July 6, 1990. Proceedings. Remote sensing of the earth's surface and atmosphere. Edited by R.P. Singh et al, p.141-147, 17 refs.
Sea ice, Drift, Ice detection, Radar tracking, Synthetic aperture radar, Data processing, Remote sensing, Geophysical surveys.

46-4728
Ice motion from airborne SAR and satellite imagery.
Kloster, K., et al. *Advances in space research*, July 1992, 12(7), Committee on Space Research Plenary Meeting, 28th, Symposium 2, Hague, Netherlands, June 25-July 6, 1990. Proceedings. Remote sensing of the earth's surface and atmosphere. Edited by R.P. Singh et al, p.149-153, 7 refs.
Flesche, H., Johannessen, O.M.
Sea ice, Radar tracking, Spaceborne photography, Drift, Radiometry, Synthetic aperture radar, Image processing, Data processing, Ice forecasting.

46-4729
TRACKER II, an improved algorithm for automatic extraction of displacement fields from sequential satellite imagery.
Marko, J.R., et al. *Advances in space research*, July 1992, 12(7), Committee on Space Research Plenary Meeting, 28th, Symposium 2, Hague, Netherlands, June 25-July 6, 1990. Proceedings. Remote sensing of the earth's surface and atmosphere. Edited by R.P. Singh et al, p.155-161, 3 refs.
Gower, J.F.R.
Sea ice, Ice detection, Spaceborne photography, Drift, Radiometry, Image processing, Computer programs, Computer applications.

46-4730
Application of satellite imagery to monitoring of sea ice motion in North China Sea.
Huang, R.H., et al. *Advances in space research*, July 1992, 12(7), Committee on Space Research Plenary Meeting, 28th, Symposium 2, Hague, Netherlands, June 25-July 6, 1990. Proceedings. Remote sensing of the earth's surface and atmosphere. Edited by R.P. Singh et al, p.163-167, 3 refs.
Wang, Q., Jin, Z.G.
Sea ice, Drift, Spaceborne photography, Radiometry, Image processing, Pack ice, Correlation, Ice edge.

46-4731
Use of satellite observations for the study of mesoscale systems in polar regions.
Claud, C., et al, *Advances in space research*, July 1992, 12(7), Committee on Space Research Plenary Meeting, 28th, Symposium 2, Hague, Netherlands, June 25-July 6, 1990. Proceedings. Remote sensing of the earth's surface and atmosphere. Edited by R.P. Singh et al, p.299-302, 10 refs.
Polar atmospheres, Spaceborne photography, Meteorological data, Radiometry, Sounding, Atmospheric disturbances.

46-4732
Experimental and simulated vibrational spectra of H2 absorbed in amorphous ice: surface structures, energetics, and relaxations.
Hixson, H.G., et al, *Journal of chemical physics*, July 15, 1992, 97(2), p.753-767, 21 refs.
Ice physics, Low temperature research, Amorphous ice, Ice spectroscopy, Hydrogen, Adsorption, Surface structure Molecular structure, Spectra, Molecular energy levels, Simulation.

46-4733
X-ray and neutron scattering studies of the structure of hyperquenched glassy water.
Bellissent-Funel, M.C., et al, *Journal of chemical physics*, July 15, 1992, 97(2), p.1282-1286, 27 refs.
Ice physics, Water structure, Amorphous ice, Supercooling, X ray diffraction, Molecular structure, Phase transformations, Low temperature research, Neutron scattering, Substrates.

46-4734
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Salonen, E., et al, International Conference on Antennas and Propagation, 7th, University of York, UK, Apr. 15-18, 1991. Part 1, London, Institution of Electrical Engineers, 1991, p.17-20, Pub.333, 5 refs.
Jokela, P.
DLC TK7871.6.I47a
Antennas, Ice accretion, Telecommunication, Snow cover effect, Radio waves, Attenuation, Wave propagation, Reflectivity, Orientation.

46-4735
Doppler-polarimetric radar measurements of the melting layer of precipitation.
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DLC TK7871.6.I47a
Precipitation (meteorology), Snow melting, Radar echoes, Reflectivity, Falling snow, Attenuation, Telecommunications, Remote sensing, Wave propagation.

46-4736
Experimental and theoretical modelling of scattering properties of melting ice spheres at microwave frequencies.
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DLC TK7871.6.I47a
Precipitation (meteorology), Ice melting, Ice crystal optics, Microwaves, Scattering, Atmospheric physics, Simulation, Radar echoes, Snow pellets.

46-4737
Microwave measurements on the scattering properties of single hydrometeors particularly relating to particles of ice and snow.
Auchterlonie, L.J., et al, International Conference on Antennas and Propagation, 7th, University of York, UK, Apr. 15-18, 1991. Part 1, London, Institution of Electrical Engineers, 1991, p.516-519, Pub.333, 9 refs.
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DLC TK7871.6.I47a
Precipitation (meteorology), Simulation, Snow pellets, Snowflakes, Microwaves, Scattering, Snow melting, Attenuation, Radar echoes, Spheres.

46-4738
Geochemical studies in Alaska by the U.S. Geological Survey, 1989.
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Nash, J.T., ed. Stoeser, J.W., ed.
Geochemistry, Exploration, Minerals, Geological surveys, Natural resources, Gold, United States—Alaska.

46-4739
Geology and mineral resources of Iditarod mining district, Iditarod B-4 and eastern B-5 quadrangles, southwestern Alaska.
Bundtzen, T.K., et al, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Professional report*, Spring 1992, No.97, 46p. + 3 sheets, 75 refs.
Miller, M.L., Laird, G.M., Bull, K.F.
Exploration, Minerals, Geological surveys, Geochemistry, Natural resources, Gold, Mining, United States—Alaska.

46-4740
Short notes on Alaskan geology 1991.
Reger, R.D., ed, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Professional report*, 1991, No.111, 98p, Refs. passim. For selected paper see 46-4741.
Geological surveys, Geochemistry, Exploration, Minerals, United States—Alaska.

46-4741
Dating Holocene moraines of Canwell Glacier, Delta River valley, central Alaska Range.
Reger, R.D., et al, *Alaska. Department of Natural Resources. Division of Geological and Geophysical Surveys. Professional report*, 1991, No.111, Short notes on Alaskan geology 1991. Edited by R.D. Reger, p.63-68, 17 refs.
Péwé, T.L.
Moraines, Glacier surveys, Soil dating, Age determination, Glacier oscillation, Alpine glaciation, United States—Alaska—Canwell Glacier.

46-4742
Ice/water interface: a molecular dynamics simulation using the simple point charge model.
Karim, O.A., et al, *Journal of chemical physics, Apr. 1, 1990, 92(7), p.4634-4635, 5 refs.*
Kay, P.A., Haymet, A.D.J.
Ice water interface, Molecular energy levels, Ice models, Hydrogen bonds.

46-4743
Condensation and structure of amorphous ices: a computational study.
Zhang, Q., et al, *Journal of chemical physics*, Jan. 15, 1990, 92(2), p.1512-1513, 11 refs.
Buch, V.
Amorphous ice, Molecular structure, Ice formation, Condensation, Ice sublimation, Hydrogen bonds, Extraterrestrial ice.

46-4744
Soil and stream water chemistry during spring snowmelt.
Hendershot, W.H., et al, *Nordic hydrology*, 1992, 23(1), p.13-26, 30 refs.
Hydrogeochemistry, Runoff, Water transport, Snowmelt, Soil water, Streams, Watersheds, Ion density (concentration), Chemical properties.

46-4745
On the applicability of GCM estimates to scenarios of global warming in the Mackenzie Valley area.
Stuart, R.A., et al, *Climatological bulletin*, Dec. 1991, 25(3), p.147-169, With French summary. 24 refs.
Judge, A.S.
Global warming, Simulation, Climatic changes, Air temperature, River basins, Temperature variations, Forecasting, Accuracy, Topographic effects, Precipitation (meteorology), Canada—Yukon Territory—Mackenzie Valley.

46-4746
Pleistocene slope instability of gas hydrate-laden sediment on the Beaufort Sea margin.
Kayen, R.E., et al, *Marine geotechnology*, Jan.-June 1991, 10(1-2), p.125-141, 35 refs.
Lee, H.J.
Ocean bottom, Natural gas, Marine geology, Bottom sediment, Hydrates, Gas inclusions, Decomposition, Landslides, Pleistocene, Sea level, Seismic surveys.

46-4747
Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers. [Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyĭ sbornik nauchnykh trudov].
Krivonogova, N.F., ed, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, 127p., In Russian. For individual papers see 46-4748 through 46-4769.
Cryogenic soils, Sands, Engineering geology, Thermal conductivity, Frozen ground thermodynamics, Ground thawing, Noncohesive soils, Frozen ground mechanics, Frozen rocks, Heat transfer coefficient, Temperature effects, Deformation, Analysis (mathematics).

46-4748
Characteristics of the formation of properties of permafrost and methods of studying them. [Osobennosti formirovaniia svoĭstv mnogoletnemerzlykh porod i metodiki ikh izucheniia].
Kagan, A.A., et al, Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyĭ sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.3-12, In Russian. 8 refs.
Krivonogova, N.F.
Frozen rocks, Frozen rock strength, Frozen rock temperature, Permafrost, Engineering geology, Geocryology, Hydrogeology, Geomorphology, Rock mechanics, Rock properties.

46-4749
Experimental studies of dynamic strength and deformation characteristics of frozen earth fills. [Eksperimental'nye issledovaniia dinamicheskikh deformatsionnykh svoĭstv merzlykh gruntovykh materialov].
Khor'kov, V.I., et al, Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyĭ sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.12-24, In Russian. 2 refs.
Earth fills, Soil water, Ground ice, Soil freezing, Soil mechanics, Frozen ground mechanics, Frozen ground thermodynamics.

46-4750
Strength of loose frozen coarse detrital soil. [Prochnost' nasypnykh merzlykh krupnooblomochnykh gruntov].
Vialov, S.S., et al, Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyĭ sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.24-29, In Russian. 2 refs.
Frozen ground strength, Soil freezing, Frozen rocks.

46-4751
Determining the characteristics of the mechanical properties of frozen coarse detrital soil using a URS-1 device. [Opredelenie kharakteristik mekhanicheskikh svoĭstv merzlykh krupnooblomochnykh gruntov ustanovkoĭ URS-1].
Istochnikov, V.O., et al, Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyĭ sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.29-31, In Russian.
Morozov, V.B., IUdkevich, A.I.
Frozen ground mechanics, Soil mechanics, Equipment.

46-4752
Formation of strength properties of thawing sands. [Formirovanie prochnostnykh svoistv ottaivaiushchikh peskov].
Karlov, V.D., et al. Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyi sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.31-34, In Russian. 2 refs.
Arefev, S.V.
Sands, Thaw weakening, Thawing, Frozen ground strength.

46-4753
Approximation method of determining the volumetric hollowness of coarse detrital soil. [Priblizhennyi metod opredeleniia ob"emnoi pustotnosti krupnooblomochnogo grunta].
Ryzhikh, A.M., et al. Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyi sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.34-38, In Russian. 2 refs.
Dolgov, V.N.
Soil physics, Volume, Analysis (mathematics).

46-4754
Physical-mechanical and thermo-physical properties of perennially frozen noncohesive soils. [Fiziko-mekhanicheskie i teplofizicheskie svoistva mnogoletnemerzlykh nesviaznykh gruntov].
Kagan, A.A., et al. Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyi sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.38-48, In Russian. 4 refs.
Krivonogova, N.F.
Noncohesive soils, Deformation, Soil compaction, Temperature effects, Ground thawing, Frozen ground mechanics, Frozen ground physics, Frozen ground thermodynamics, Permeability.

46-4755
Experimental studies on the formation of cryogenic structures on ash dumps of thermal power plants. [Eksperimental'noe izuchenie formirovaniia kriogennykh tekstur na zolootvalakh teplovykh elektrostantsii].
Ogarkov, A.A., Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyi sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.48-53, In Russian. 2 refs.
Electric power, Cryogenic structures, Cryogenic textures.

46-4756
Experimental studies of the geophysical and physical-mechanical properties of frozen coarse detrital soil. [Eksperimental'nye issledovaniia geofizicheskikh i fiziko-mekhanicheskikh kharakteristik merzlykh krupnooblomochnykh gruntov].
Voronkov, O.K., et al. Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyi sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.53-61, In Russian.
Kozin, N.N.
Frozen ground mechanics, Frozen ground physics, Geophysical surveys, Analysis (mathematics).

46-4757
Sand compaction during the hydro-mechanization of construction work. [Konsolidatsiia peska pri gidromekhanizatsii stroitel'nykh rabot].
Aksenov, B.G., Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyi sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.61-65, In Russian. 5 refs.
Sands, Mathematical models, Soil compaction, Cold weather construction, Environmental impact.

46-4758
Supercooling and freezing temperatures of noncohesive soils. [O temperaturakh pereokhlazhdeniia i zamerzaniia nesviaznykh gruntov].
Shtykov, V.I., Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyi sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.65-68, In Russian. 3 refs.
Noncohesive soils, Cryogenic soils, Supercooling, Soil freezing, Freezing points.

46-4759
Results of studies on the deformation of coarse detrital soil during freezing. [Rezul'taty issledovanii deformatsii krupnooblomochnykh gruntov pri promerzanii].
Izmailova, O.V., Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyi sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.68-71, In Russian. 5 refs.
Soil freezing, Cryogenic soils, Deformation, Soil mechanics, Frost heave.

46-4760
Deformation characteristics of structures of earth- fill coarse detrital soil in the cryolithozone. [Osobennosti deformirovaniia sooruzhenii iz nasypnykh krupnooblomochnykh gruntov v kriolitozone].
Gavrilov, A.N., et al. Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyi sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.71-76, In Russian. 12 refs.
Shramkova, V.N.
Deformation, Rheology, Cryogenic soils, Forecasting, Foundations, Earth fills, Analysis (mathematics).

46-4761
Thermocompressive method of testing thawing ground. [Termopressiometricheskii metod ispytanii ottaivaiushchikh gruntov].
Orzhekhovskii, IU.R., et al. Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyi sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.76-81, In Russian. 4 refs.
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Ground thawing, Deformation, Cryogenic textures, Compressive properties, Mathematical models, Thaw weakening.

46-4762
Determining the strength properties and thickness of deposits on slopes based on automated inverse calculations. [Opredelenie prochnostnykh svoistv i moshchnosti sklonovykh otlozhenii na osnove avtomatizirovannykh obratnykh raschetov].
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IUdkevich, A.I.
Models, Engineering geology, Slopes, Alluvium, Bearing strength, Geocryology.

46-4763
Frost heave of ash-slag materials and ash-soil mixtures and their use in engineering structures. [Kriogennoe puchenie zoloshlakovykh materialov i zologruntovykh smesei i ikh ispol'zovanie v inzhenernykh sooruzheniiakh].
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Panteleev, V.G., Zholnerovich, V.G.
Frost heave, Engineering geology, Deformation.

46-4764
Technology of ice massif buildups. [Tekhnologiia namorazhivaniia ledianykh massivov].
Shatalina, I.N., Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyi sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.92-100, In Russian. 4 refs.
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46-4765
Determining the filtration coefficients of frozen noncohesive soils. [Ob opredelenii koeffitsientov fil'tratsii merzlykh nesviaznykh gruntov].
Shtykov, V.I., Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyi sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.100-104, In Russian. 3 refs.
Noncohesive soils, Seepage, Analysis (mathematics), Unfrozen water content, Frozen ground thermodynamics.

46-4766
Determining the effect of temperature, humidity, and salinity on the electrical resistivity of frozen rocks. [Uchet vliianiia temperatury, vlazhnosti i solevogo sostava na elektricheskoe soprotivlenie merzlykh porod].
Velikin, S.A., et al. Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyi sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.104-109, In Russian.
Snegirev, A.M.
Frozen rocks, Electrical resistivity, Humidity, Salinity, Temperature effects.

46-4767
Laboratory investigations of the thermophysical properties of soils. [Laboratornye issledovaniia teplofizicheskikh svoistv gruntov],
Zaltsev, V.S., et al, Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyĭ sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.109-112, In Russian.
Taskaev, V.A., [Anitskiĭ, P.A.
Analysis (mathematics), Heat transfer, Thermal conductivity, Heat capacity, Frozen ground thermodynamics, Unfrozen water content, Phase transformations.

46-4768
Characteristics of heat transfer and ice formation in open and forested rock streams. [Osobennosti teploobmena i formirovaniia l'da v otkrytykh i zalesennykh kurumakh],
Mal'chikova, I.IU., Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyĭ sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.113-117, In Russian.
Heat transfer, Ice formation, Rock streams, Radiation balance, Heat balance.

46-4769
Study of the thermal conductivity of thawed and frozen soils under field conditions. [Izuchenie teploprovodnosti talykh i merzlykh gruntov v polevykh usloviiakh],
Voevodin, I.IU., et al, Inzhenerno-geologicheskoe izuchenie i otsenka merzlykh, promerzaiushchikh i protaivaiushchikh peschanykh i krupnooblomochnykh gruntov; mezhduvedomstvennyĭ sbornik nauchnykh trudov (Engineering geology study and analysis of frozen, freezing and thawing sandy and coarse detrital soil; interdepartmental collected scientific papers). Edited by N.F. Krivonogova, Leningrad, VNIIG im. B.E. Vedeneeva, 1990, p.117-120, In Russian. 5 refs.
Thermal conductivity, Frozen ground thermodynamics, Ground thawing, Analysis (mathematics).

46-4770
Ocean currents in Discovery Bay. [Estudio de corrientes marinas en la Bahía Chile (Bahía Discovery)],
Medina, F., *Acta antártica ecuatoriana*, 1990, Vol.1, p.1-11, In Spanish with English summary. 6 refs.
Ocean currents, Floating ice, Wind factors, Antarctica—Discovery Bay.
Surface water velocities have been measured in Chile Bay as part of the Second Ecuadorian Antarctic Scientific Expedition, during the southern summer, 1990. Drifting ice floes broken from shore were used as a Lagrangian tracer. Surface currents and wind observations are compared. Surface circulation is determined by winds, when the wind speed is higher than 6 m/s. Maximum values and direction of the surface drift current depend exclusively upon the prevailing wind field. Current speed may reach up to 40 cm/s. (Auth.)

46-4771
Features of the physical oceanographic conditions of the Barents Sea.
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Ocean currents, Sea ice, Sea water, Climate, Barents Sea.

46-4772
Stratification and water mass formation in the Arctic Ocean: some implications for the nutrient distribution.
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Larsson, A.M., Sehlstedt, P.I.
Sea water, Sea ice, Nutrient cycle, Arctic Ocean.

46-4773
Simulation of currents, ice melting, and vertical mixing in Barents Sea using a 3-D baroclinic model.
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Slagstad, D.
Ocean currents, Sea ice, Ice melting, Models, Barents Sea.

46-4774
Study of the climatic system in the Barents Sea.
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Loeng, H.
Atmospheric pressure, Sea ice, Sea water, Barents Sea.

46-4775
Rn-222 and Ra-226: indicators of sea-ice effects on air-sea gas exchange.
Fanning, K.A., et al, *Polar research*, Dec. 1991, 10(1), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.51-58, 14 refs.
Torres, L.M.
Radioactive isotopes, Sea ice, Gas inclusions, Barents Sea.

46-4776
Barents Sea drift ice characteristics.
Vinje, T., et al, *Polar research*, Dec. 1991, 10(1), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.59-68, 28 refs.
Kvambekk, Å.S
Sea ice distribution, Drift, Ice cover.

46-4777
Primary production in polar waters: relation to nutrient availability.
Harrison, W.G., et al, *Polar research*, Dec. 1991, 10(1), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.87-104, Refs. p.100-104.
Cota, G.F.
Biomass, Plankton, Sea ice, Nutrient cycle.
Temperature, light and dissolved nutrients are considered the "master" abiotic properties controlling primary production in the ocean. Each of these properties in turn is influenced by water column stability and vertical mixing. For both polar regions, extremes in each of these properties is the rule in surface waters where phytoplankton grow: the lowest ocean temperatures, the greatest seasonal excursion in incident solar radiation, and the highest dissolved nutrient concentrations. Current perspectives are that important differences exist between the Arctic and Antarctic with regard to the availability and the role nutrients play in regulating primary production. In general, much less emphasis is now placed on the significance of the macronutrients in the Antarctic, although there is speculation and some evidence that "micronutrients" (Fe) may be important. Macronutrient availability appears to play a more important, though secondary, role in the Arctic, that of sustaining rather than initiating phytoplankton growth. This paper reviews early, contemporary, and present research addressing the question, "What role does nutrient availability play in the distribution and magnitude of primary production in Arctic and Antarctic waters?" Emphasis is placed on new research on under-ice communities as well as on the historically studied pelagic communities. (Auth. mod.)

46-4778
Meridional zonation of the Barents Sea ecosystem *inferred from satellite remote sensing and in situ* bio-optical observations.
Mitchell, B.G., et al, *Polar research*, Dec. 1991, 10(1), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.147-162, 25 refs.
Chlorophylls, Ice edge, Sea ice, Plankton, Ecosystems, Barents Sea.

46-4779
Nitrogen uptake rates in phytoplankton and ice algae in the Barents Sea.
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Farbrot, T.
Algae, Plankton, Sea ice, Biochemistry, Barents Sea.

46-4780
Are bacteria active in the cold pelagic ecosystem of the Barents Sea.
Thingstad, T.F., et al, *Polar research*, Dec. 1991, 10(1), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.255-266, 33 refs.
Martinussen, I.
Bacteria, Nutrient cycle, Algae, Ice edge.

46-4781
Microbial communities from the sea ice and adjacent water column at the time of ice melting in the northwestern part of the Weddell Sea.
Mathot, S., et al, *Polar research*, Dec. 1991, 10(1), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.267-275, 38 refs.
Becquevort, S., Lancelot, C.
Algae, Plankton, Sea ice, Ice edge, Antarctica—Weddell Sea.
Microbial composition—including microalgae, bacteria and protozoans—and potential metabolic activity of its autotrophic compartment were measured in Dec. 1988 in several microenvironments that characterize the northwest sector of the marginal area of the Weddell Sea: infiltration and band assemblages of ice floes and adjacent waters were investigated. At the time of ice melting, a shift from a diatom dominated population (ice) to a flagellate dominated population (water column) was observed. Nevertheless, this shift was not due to an "inability" of the ice-diatoms to grow in the water column. Macrograzing and/or sedimentation are suggested as possible causes of the disappearance of diatoms during ice melting. The remaining small autotrophic forms released by the ice would constitute a significant seeding stock for the growth of ice-edge blooms. (Auth.)

46-4782
Ice algae in the Barents Sea: types of assemblages, origin, fate and role in the ice-edge phytoplankton bloom.
Syvertsen, E.E., *Polar research*, Dec. 1991, 10(1), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.277-287, 43 refs.
Algae, Ice edge, Plankton, Barents Sea.

46-4783
Source, density and composition of sympagic fauna in the Barents Sea.
Lönne, O.J., et al, *Polar research*, Dec. 1991, 10(1), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.289-294, 13 refs.
Gulliksen, B.
Animals, Sea ice.

46-4784
Development of Arctic sea-ice organisms under graded snow cover.
Gradinger, R., et al, *Polar research*, Dec. 1991, 10(1), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.295-307, 45 refs.
Spindler, M., Henschel, D.
Sea ice, Ice cores, Snow cover, Hydrography, Microbiology.

46-4785
Ecophysiology of under-ice fauna.
Aarset, A.V., *Polar research*, Dec. 1991, 10(1), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.309-324, Refs. p.322-324.
Water chemistry, Animals, Physiological effects, Cold tolerance.

46-4786
Coupling between ice microalgal productivity and the pelagic, metazoan food web in southeastern Hudson Bay: a synthesis of results.
Runge, J.A., et al, *Polar research*, Dec. 1991, 10(2), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.325-338, 28 refs.
Sea ice, Algae, Nutrient cycle, Canada—Hudson Bay.

46-4787
Physiology of polar marine zooplankton.
Clarke, A., et al, *Polar research*, Dec. 1991, 10(2), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.355-369, Refs. p.366-369.
Peck, L.S.
Plankton, Physiological effects, Sea ice, Ice edge.
The polar marine environment is characterized by low stable temperatures with seasonal variations ranging from 3 C at lower latitudes to only 0.2 C at high latitudes. The arctic basin is dominated by multi-year ice whereas the Antarctic is subject to large seasonal changes in the cover by annual sea ice. Primary production is intensely seasonal nearshore but probably less so in offshore waters where significant production is associated with the marginal ice zone. Oxygen consumption in polar zooplankton is low compared with temperate and tropical species. Annual growth rates are generally slow and, especially in herbivores, highly seasonal. Lipid stores in polar herbivorous zooplankton are generally high, although some euphausiids and gelatinous zooplankton also rely on degrowth to provide energy over winter. Ice-edge blooms are of great importance to the polar marine food web although the quantitative significance of winter feeding under ice has yet to be resolved. Comparison of data on lipid storage and oxygen consumption for polar zooplankton indicates that there are large differences in the energy requirements of benthos and crustacean zooplankton. In contrast, gelatinous zooplankton (salps, ctenophores, medusae and siphonophores) have a low energy throughout related to a body composition, which renders them essentially neutral in buoyancy and a slow but efficient means of locomotion. Under good feeding conditions many species can therefore grow and reproduce very rapidly. (Auth. mod.)

46-4788
Wax ester composition of the dominant calanoid copepods of the Greenland Sea/Fram Strait region.
Kattner, G., et al, *Polar research*, Dec. 1991, 10(2), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.479-485, 23 refs.
Graeve, M.
Physiological effects, Plankton, Sea ice, Ice edge.

46-4789
Oil, water, ice and light.
Sydnes, L.K., *Polar research*, Dec. 1991, 10(2), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.609-618, 45 refs.
Sea water, Sea ice, Light effects, Chemical analysis, Crude oil.

46-4790
Oil-weathering behavior in Arctic environments.
Payne, J.R., et al, *Polar research*, Dec. 1991, 10(2), Pro Mare Symposium on Polar Marine Ecology, Trondheim, Norway, May 1990. Proceedings, edited by E. Sakshaug, C.C.E. Hopkins, and N.A. Oritsland, p.631-662, 47 refs.
McNabb, G.D., Jr., Clayton, J.R., Jr.
Weathering, Oil spills, Chemical analysis, Sea ice, Sea water.

46-4791
Kinetics of reduction of a nitroxide radical by hydrazobenzene in frozen liquid crystals.
Boronina, T.N., et al, *Kinetics and catalysis*, May 1992, 32(6)Pt.1, p.1177-1184, Translated from Kinetika i kataliz. 25 refs.
Chudinov, G.E., Batiuk, V.A., Sergeev, G.B.
Frozen liquids, Solid phases, Cryogenics, Chemistry, Temperature effects, Chemical analysis, Low temperature research.

46-4792
Formation of gas hydrate or ice by direct-contact evaporation of CFC alternatives.
Isobe, F., et al, *Revue internationale du froid*, 1992, 15(3), p.137-142, With French summary. 16 refs.
Mori, Y.H.
Refrigeration, Evaporation, Cold storage, Vapor diffusion, Hydrates, Ice formation, Supercooling, Admixtures, Surfactants, Low temperature research.

46-4793
Optimum solutions for cold-storage flooring and central frost-heave protective heating systems.
Oheim, H., *Revue internationale du froid*, 1992, 15(3), p.177-180, With French summary. 4 refs.
Cold storage, Floors, Frost heave, Frost protection, Design, Radiant heating, Concrete structures, Buildings, Structural analysis.

46-4794
Measurement and characterization of the pressure-sinkage data for snow obtained using a Rammsonde.
Wong, J.Y., et al, *Journal of terramechanics*, Mar. 1992, 29(2), p.265-280, 9 refs.
Irwin, G.J.
Penetrometers, Penetration tests, Snow compression, Snow hardness, Performance, Snow mechanics, Tracked vehicles, Design criteria.

46-4795
Effect of frozen storage of open-ocean seawater samples on the concentration of dissolved phosphate and nitrate.
Clementson, L.A., et al, *Water research*, Sep. 1992, 26(9), p.1171-1176, 14 refs.
Wayte, S.E.
Sea water, Preserving, Freezing, Cold storage, Water treatment, Decomposition, Ice composition, Chemical analysis, Temperature effects.

46-4796
December 1990 snowfall in the Rhône-Alpes region. [L'épisode neigeux de décembre 1990 dans la région Rhône-Alpes].
Deblaere, J.C., *La houille blanche*, 1991, No.5, p.333-338, In French with English summary.
Snowfall, Snow accumulation, Mountains, Meteorological factors, Snow cover distribution, Snow cover effect.

46-4797
Transport of snow by wind in the mountains: site and laboratory measurements—first simulation. [Transport de la neige par le vent en montagne: mesure sur site et en laboratoire, premiere modelisation].
Castelle, T., et al, *La houille blanche*, 1991, No.5, p.379-386, In French. 11 refs. For another version see 45- 1784.
Clappier, A., Roussel, M.
Mountains, Blowing snow, Snow air interface, Wind factors, Topographic effects, Simulation, Snow physics, Snow erosion.

46-4798
Study of snow transportability conditions at a high mountain site. [Etude des conditions de transportabilité de la neige sur un site de haute montagne].
Guyomarc'h, G., et al, *La houille blanche*, 1991, No.5, p.387-391, In French. For another version see 45-1785.
Merindol, L.
Mountains, Wind factors, Blowing snow, Snow cover stability, Snow air interface, Snow mechanics, Snow erosion, Wind direction, Periodic variations.

46-4799
Visible and infrared radiometry of snow cover. [Radiométrie visible et infra-rouge du manteau neigeux].
Dedieu, J.P., *La houille blanche*, 1991, No.5, p.392-396, In French. 6 refs.
Snow cover structure, Snow optics, Radiometry, Reflectivity, Remote sensing, Luminance, Measuring instruments.

46-4800
Aerodynamic characteristics of hoar frost roughness.
Kind, R.J., et al, *AIAA journal*, July 1992, 30(7), p.1703-1707, 23 refs.
Lawrysyn, M.A.
Aircraft icing, Hoarfrost, Air flow, Ice air interface, Turbulent boundary layer, Surface roughness, Ice cover effect, Replicas, Laminar flow, Performance.

46-4801
Numerical experiment of climatic effect of antarctic sea ice during the Northern Hemisphere summer.
Yang, X.Q., et al, *Chinese journal of atmospheric sciences*, 1992, 16(1), p.80-89, 15 refs.
Huang, S.S.
Atmospheric circulation, Air temperature, Sea ice, Ice cover effect, Simulation, Climatic factors, Global change.
In this paper, the short-term climatic effect induced by the removal of antarctic sea ice is studied by using a perpetual July general circulation model. The results show that the removal of antarctic sea ice appears to weaken the polar vortex through heating the atmosphere near the local region, and then to induce the ultra-long wave anomaly associated with amplifying the amplitude of the zonal wavenumber 3 at the middle and high latitudes of the Southern Hemisphere. Anomalies of the southern hemispheric circulation intensify the East Asian monsoon and rainfall, which excite a wavetrain from East Asia to North America and cause the anomalies of the northern hemispheric circulation. An interpretation of the dynamic mechanism of antarctic sea ice climatic effect is also proposed. (Auth. mod.)

46-4802
Cogeneration system for a heavy-snow fall zone based on aquifer thermal energy storage.
Umemiya, H., et al, *Japan Society of Mechanical Engineers. International journal*, Nov. 1990, 33(4)Ser.2, p.757-765, 10 refs.
Satoh, Y.
Heating, Snow melting, Heat recovery, Snow removal, Performance, Underground storage, Design, Cost analysis, Thermal analysis, Ground water.

46-4803
Distribution of impurities in antarctic ice.
Potts, W.T.W., et al, *Scanning microscopy*, Mar. 1992, 6(1), p.295-299, 12 refs.
Oates, K., Wolff, E.W., Mulvaney, R.
Glacier ice, Ice sampling, Impurities, Scanning electron microscopy, Ion density (concentration), Ice water interface, Ice cores, Films, Bubbles, Atmospheric composition.
Antarctic snow and ice contain very low concentrations of ions, <10 micromole/l Na, Cl and SO_4, but these ions may play a significant part in determining the physical properties of the ice and atmospheric chemistry. At the temperatures pertaining in the Antarctic, sulphuric acid would still be liquid and information on the distribution of these ions, whether they are disseminated through the crystals or concentrated in a liquid phase at the triple junctions between the crystals, is essential in order to model some of the physical properties of the ice, including electrical conductivity, rigidity and transparency to radar. Samples of 125 year old ice from the Antarctic Peninsula were planed with a sledge microtome, coated with 23 nm of Al and maintained at -160 C in a scanning electron microscope. X-ray emission analysis of areas 1 micron square showed that S was concentrated at the triple junctions. At the temperature of the ice-sheet, -16.5 C, the sulphuric acid would be a liquid in equilibrium with the ice at a concentration of about 2.6 mole l, but when frozen rapidly to stage temperature it would form vitreous ice at a concentration of 2.6 mole l or it might be further concentrated to its eutectic of 4.9 mole l. No Na or Cl were detected either at the triple junctions or elsewhere in the ice crystal. An understanding of the processes involved in the distribution and segregation of the ions, in both the atmosphere and the ice sheet, will be necessary in order to model atmospheric and ice sheet chemistry and physics. (Auth. mod.)

46-4804
Visible extinction measurements in rain and snow using a forward scatter meter.
Hutt, D.L., et al, *SPIE—The International Society for Optical Engineering. Proceedings.*, 1991, Vol.1487, Propagation engineering (4th). Edited by L.R. Bissonnette et al, p.312-323, 15 refs.
Oman, J.
DLC QC880.4.T8P76 1991
Precipitation (meteorology), Measuring instruments, Light scattering, Snow optics, Wave propagation, Attenuation, Falling snow, Performance, Visibility, Lasers.

46-4805
Testing the groundwater ridging hypothesis of streamflow generation during snowmelt in a forested catchment.
Buttle, J.M., et al, *Journal of hydrology*, July 1992, 135(1-4), p.53-72, 30 refs.
Sami, K.
Snowmelt, Water transport, Runoff, Stream flow, Ground water, Leaching, Water table, Wetlands, Snow hydrology, Saturation.

46-4806
Environmental tracer analysis of winter profile development in two basins of Shagawa Lake, Minnesota.
Stauffer, R.E., *Journal of hydrology*, July 1992, 135(1-4), p.175-200, 45 refs.
Limnology, Lake water, Lake ice, Ice cover effect, Water chemistry, Hydrogeochemistry, Stratification, Water transport, Subglacial observations, Hydrology.

46-4807
Particle movement of melt water in a subdrained agricultural basin.
Bengtsson, L., et al, *Journal of hydrology*, July 1992, 135(1-4), p.383-398, 31 refs.
Seuna, P., Lepistö, A., Saxena, R.K.
Surface waters, Meltwater, Subsurface drainage, Runoff, Snowmelt, Seepage, Water transport, Streams, Agriculture, Soil water migration.

46-4808
Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas. [Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR],
Agarova, I.IA., ed, Moscow, Gidrometeoizdat, 1991, 339p., Refs. passim. In Russian with English summaries. For selected papers see 46-4809 through 46-4825.
Gupalo, E.IU., ed.
Plankton, Algae, Microbiology, Marine biology, Ecology, Distribution, Sampling, Biomass.

46-4809
Some methodological problems of phytoplankton sampling strategy in ecological studies. [Nekotorye metodicheskie trebovaniia k sboru dannykh o fitoplanktone v ekologicheskikh issledovaniiakh],
Smirnov, N.A., Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.4-9, In Russian with English summary. 12 refs.
Plankton, Microbiology, Marine biology, Ecology, Sampling, USSR—White Sea.

46-4810
Partial photosynthetical activities of phytoplankton populations and a method for their estimation. [Partsial'nye fotosinteticheskie aktivnosti populiatsiĭ fitoplanktona i metod ikh otsenki],
Fedorov, V.D., et al, Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.10-25, In Russian with English summary. 29 refs.
Smirnov, N.A., Il'iash, L.V.
Plankton, Microbiology, Marine biology, Ecology, Analysis (mathematics), Photosynthesis, USSR—White Sea.

46-4811
Species composition, distribution and year-to-year changes in phytoplankton in the eastern Gulf of Finland. [Sostav, raspredelenie i mezhgodovye izmeneniia fitoplanktona vostochnoĭ chasti Finskogo zaliva],
Nikulina, V.N., Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.55-68, In Russian with English summary. 17 refs.
Plankton, Microbiology, Marine biology, Ecology, Distribution, Finland, Gulf.

46-4812
Phytoplankton distribution in the White Sea basin in July 1972 and August 1973. [Raspredelenie fitoplanktona v basseĭne Belogo moria v iule 1972 g. i v avguste 1973 g.],
Sergeeva, O.M., Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.82-94, In Russian with English summary. 14 refs.
Plankton, Microbiology, Marine biology, Ecology, Distribution, USSR—White Sea.

46-4813
Phytoplankton species composition in the Nil'ma River estuary (Kandalaksha Bay, White Sea). [Vidovoĭ sostav fitoplanktona estuariia r.Nil'ma (Kandalakshskiĭ zaliv Belogo moria)],
Likhacheva, N.E., Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.95-110, In Russian with English summary. 10 refs.
Plankton, Microbiology, Marine biology, Ecology, USSR—White Sea.

46-4814
Phytoplankton of Chupa Bay (Kandalaksha Bay, White Sea). [Fitoplankton guby Chupa (Kandalakshskiĭ zaliv Belogo moria)],
Sarukhan-Bek, K.K., et al, Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.111-120, In Russian with English summary. 10 refs.
Radchenko, I.G., Kol'tsova, T.I.
Plankton, Microbiology, Marine biology, Ecology, USSR—White Sea.

46-4815
Phytoplankton in the mixing zone between the Barents and White Seas. [Fitoplankton zony transformatsii barentsevomorskikh i belomorskikh vodnykh mass],
Makarevich, P.R., et al, Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.121-126, In Russian with English summary. 9 refs.
Druzhkov, N.V., Bobrov, IU.A.
Plankton, Microbiology, Marine biology, Ecology, Barents Sea, USSR—White Sea.

46-4816
Phytoplankton of the southeastern part of the Barents Sea in July-August 1977. [Fitoplankton iugovostochnoĭ chasti Barentseva moria v iule-avguste 1977 g.],
Vasiutina, N.P., Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.127-134, In Russian with English summary. 8 refs.
Plankton, Microbiology, Marine biology, Ecology, Sampling, Barents Sea.

46-4817
Size structure of the population of the diatom *Skeletonema costatum* (Grev.) Cl. from the White Sea as affected by nutrient composition of the culture medium. [Razmernaia struktura populiatsii belomorskoĭ diatomovoĭ vodorosli *Skeletonema costatum* (Grev.) Cl. pri razlichnykh usloviiakh kul'tivirovaniia],
Il'iash, L.V., Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.168-174, In Russian with English summary. 25 refs.
Algae, Plankton, Microbiology, Marine biology, Ecology, USSR—White Sea.

46-4818
Evaluation of the effect of sublethal metal concentrations on phytoplankton in the White Sea. [Otsenki vozdeĭstviia subletal'nykh kontsentratsiĭ tiazhelykh metallov na fitoplankton Belogo moria],
Kapkov, V.I., et al, Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.175-190, In Russian with English summary. 29 refs.
Shidlovskaia, N.A., Maksimov, V.N.
Plankton, Microbiology, Marine biology, Ecology, Environmental impact, Water pollution, Metals, USSR—White Sea.

46-4819
Effect of phytoplankton growth rate and water mixing on vertical distribution of phytoplankton in the Bering Sea. [Vliianie skorosti deleniia kletok vodorosleĭ i intensivnosti peremeshivaniia vody na vertikal'noe raspredelenie fitoplanktona v Beringovom more],
Ventsel', M.V., et al, Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.216-226, In Russian with English summary. 17 refs.
Korsak, M.N., Shigaev, V.V.
Plankton, Microbiology, Marine biology, Ecology, Distribution, Ocean currents, USSR—White Sea.

46-4820
Seasonal dynamics of phytoplanktonic and microphytobenthic productivity in the upper subintertidal zone of the Barents Sea. [Sezonnaia dinamika produktsionnykh kharakteristik fitoplanktona i mikrofitobentosa v priberezh'e Barentseva moria],
Kuznetsov, L.L., Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.232-241, In Russian with English summary. 16 refs.
Plankton, Microbiology, Marine biology, Ecology, Biomass, Algae, Barents Sea.

46-4821
Microalgae in the polluted intertidal zone of Kandalaksha Bay, White Sea. [Mikrovodorosli zagriaznennykh uchastkov litorali Kandalakshskogo porta (Beloe more)],
Bondarchuk, L.L., Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.242-255, In Russian with English summary. 27 refs.
Algae, Microbiology, Marine biology, Ecology, Environmental impact, Water pollution, Biomass, USSR—White Sea.

46-4822
Primary colonization of artificial substrates by microalgae at a mussel farm (White Sea). [Nachal'nye stadii kolonizatsii iskusstvennykh substratov mikrovodorosliami v usloviiakh marikul'tury midiĭ (Beloe more)],
Bondarchuk, L.L., et al, Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.256-266, In Russian with English summary. 18 refs.
Kulakovskiĭ, E.E., Khalaman, V.V.
Algae, Plankton, Microbiology, Marine biology, Ecology, Sea ice, Ice melting, USSR—White Sea.

46-4823
Energy resources and herbivorous zooplankton energy requirements in the Central Arctic basin. [Energeticheskie resursy i energeticheskie potrebnosti rastitel'noiadnogo zooplanktona v Tsentral'noĭ Arktike],
Kosobokova, K.N., Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.267-275, In Russian with English summary. 23 refs.
Plankton, Microbiology, Marine biology, Ecology, Biomass, Arctic Ocean.

46-4824
Simulation model of plankton population dynamics in Kandalaksha Bay (White Sea). [Imitatsionnaia model' dinamiki planktonnogo soobshchestva Kandalakshskogo zaliva Belogo moria],
Barabasheva, IU.M., et al, Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.276-284, In Russian with English summary. 18 refs.
Plankton, Microbiology, Marine biology, Ecology, Computerized simulation, USSR—White Sea.

46-4825
Rates of particle ingestion, defecation, and sedimentation of fecal pellets in White Sea *Calanus glacialis* fed on different species of phytoplankton. [Skorost' potrebleniia razlichnykh vidov fitoplanktona, kolichestvo vydeliaemykh fekal'nykh pellet i skorost' ikh osedaniia u belomorskogo *Calanus glacialis*],
Arashkevich, E.G., et al, Issledovaniia fitoplanktona v sisteme monitoringa Baltiĭskogo moria i drugikh morei SSSR (Phytoplankton studies in the monitoring of the seas with reference to the Baltic and other seas). Edited by I.IA. Agarova and E.IU. Gupalo, Moscow, Gidrometeoizdat, 1991, p.285-294, In Russian with English summary. 20 refs.
Sergeeva, O.M.
Plankton, Microbiology, Marine biology, Ecology, Sedimentation.

46-4826
Improving the efficiency of developing mineral deposits in Eastern Siberia; collected scientific papers. [Povyshenie effektivnosti razrabotki mestorozhdenii poleznykh iskopaemykh Vostochnoi Sibiri; sbornik nauchnykh trudov].
Liakhov, A.I., ed, Irkutsk, Irkutskii Politekhnicheskii Institut, 1989, 121p., In Russian. Refs. passim. For selected papers see 46-4827 through 46-4830.
Cold weather operation, Equipment, Mining.

46-4827
Using shotcrete at subzero temperatures. [K voprosu primeneniia nabryzgbetona v usloviiakh otritsatel'nykh temperatur].
Zubarev, A.M., Povyshenie effektivnosti razrabotki mestorozhdenii poleznykh iskopaemykh Vostochnoi Sibiri; sbornik nauchnykh trudov (Improving the efficiency of developing mineral deposits in Eastern Siberia; collected scientific papers). Edited by A.I. Liakhov, Irkutsk, Irkutskii Politekhnicheskii Institut, 1989, p.26-28, In Russian. 3 refs.
Winter concreting, Concretes, Concrete admixtures.

46-4828
Improving the performance and efficiency of quarry excavators in cold climate regions. [Povyshenie nadezhnosti i effektivnosti ispol'zovaniia kar'ernykh ekskavatorov v raionakh kholodnogo klimata].
Makhno, D.E., Povyshenie effektivnosti razrabotki mestorozhdenii poleznykh iskopaemykh Vostochnoi Sibiri; sbornik nauchnykh trudov (Improving the efficiency of developing mineral deposits in Eastern Siberia; collected scientific papers). Edited by A.I. Liakhov, Irkutsk, Irkutskii Politekhnicheskii Institut, 1989, p.81-85, In Russian. 3 refs.
Cold weather performance, Equipment, Excavation, Mining, Quarries.

46-4829
Setting standards for maintenance work in Northern open pit mines. [Normirovanie remontnykh rabot na kar'erakh Severa].
Shadrin, A.I., et al, Povyshenie effektivnosti razrabotki mestorozhdenii poleznykh iskopaemykh Vostochnoi Sibiri; sbornik nauchnykh trudov (Improving the efficiency of developing mineral deposits in Eastern Siberia; collected scientific papers). Edited by A.I. Liakhov, Irkutsk, Irkutskii Politekhnicheskii Institut, 1989, p.86-88, In Russian. 2 refs.
Pil'kevich, D.G., Makarov, A.P., Avlov, D.A.
Mine shafts, Mining, Standards, Maintenance, Cold weather operation.

46-4830
Problem of modelling the operation of an excavator-automotive complex in the North. [K voprosu modelirovaniia raboty ekskavatorno-avtomobil'nogo kompleksa v usloviiakh Severa].
Pukov, I.V., Povyshenie effektivnosti razrabotki mestorozhdenii poleznykh iskopaemykh Vostochnoi Sibiri; sbornik nauchnykh trudov (Improving the efficiency of developing mineral deposits in Eastern Siberia; collected scientific papers). Edited by A.I. Liakhov, Irkutsk, Irkutskii Politekhnicheskii Institut, 1989, p.88-89, In Russian.
Mathematical models, Cold weather operation, Equipment, Motor vehicles.

46-4831
Complex geophysical model of the earth's crust in the arctic basin. [Kompleksnaia geofizicheskaia model' zemnoi kory Arkticheskogo basseina].
Verba, V.V., et al, Teoriia i praktika regional'nykh geofizicheskikh issledovanii mirovogo okeana i Antarktiki (Theory and practice of regional geophysical investigations in the world ocean and the Antarctic). Edited by N.N. Rzhevskii and M.A. Kholmianskii, Leningrad, Sevmorgeologiia, 1989, p.25-31, In Russian. 10 refs.
Volk, V.E., Gubernov, A.P.
Earth crust, Geophysical surveys, Models, Arctic Ocean.

46-4832
Geological-geophysical prerequisites for existence and the possibility of forecasting gas hydrates in the Bering Sea using seismic data. [Geologo-geofizicheskie predposylki sushchestvovaniia i vozmozhnosti prognoza gazovykh gidratov v Beringovom more po seismicheskim dannym].
Dmitrieva, G.A., et al, Teoriia i praktika regional'nykh geofizicheskikh issledovanii mirovogo okeana i Antarktiki (Theory and practice of regional geophysical investigations in the world ocean and the Antarctic). Edited by N.N. Rzhevskii and M.A. Kholmianskii, Leningrad, Sevmorgeologiia, 1989, p.40-46, In Russian. 6 refs.
Net'eva, F.V.
Hydrates, Forecasting, Seismic surveys, Geophysical surveys, Bering Sea.

46-4833
Natural electric fields—a factor in the formation of ore deposits on a shelf. [Estestvennoe elektricheskoe pole – faktor obrazovaniia rudnykh mestorozhdenii na shel'fe].
Kholmianskii, M.A., Teoriia i praktika regional'nykh geofizicheskikh issledovanii mirovogo okeana i Antarktiki (Theory and practice of regional geophysical investigations in the world ocean and the Antarctic). Edited by N.N. Rzhevskii and M.A. Kholmianskii, Leningrad, Sevmorgeologiia, 1989, p.131-134, In Russian. 8 refs.
Electric fields, Geoelectricity, Geophysical surveys, Analysis (mathematics), Minerals.

46-4834
Resolving power of geophysical methods on a shelf. [Razreshaiushchaia sposobnost' geofizicheskikh metodov na shel'fe].
Kholmianskii, M.A., Teoriia i praktika regional'nykh geofizicheskikh issledovanii mirovogo okeana i Antarktiki (Theory and practice of regional geophysical investigations in the world ocean and the Antarctic). Edited by N.N. Rzhevskii and M.A. Kholmianskii, Leningrad, Sevmorgeologiia, 1989, p.135-143, In Russian. 13 refs.
Geophysical surveys, Analysis (mathematics), Acoustics, USSR—Laptev Sea, Arctic Ocean.

46-4835
Winter road maintenance in urban areas—road safety and trafficability. Overview.
Möller, S., et al, *Sweden. Transportforskningsberedningen. Statens väg- och trafikinstitut. TFB and VTI forskning/research*, 1991, No.2:2A, 45p.
Wallman, C.G., Gregersen, N.P.
Road icing, Road maintenance, Municipal engineering, Safety.

46-4836
Polar lows.
Turner, J., et al, *Weather*, Apr. 1991, 46(4), p.107-114, 24 refs.
Lachlan-Cope, T., Rasmussen, E.A.
Polar atmospheres, Atmospheric disturbances, Atmospheric circulation, Atmospheric pressure, Air masses, Air ice water interaction.

46-4837
Excursion guide-book.
International Symposium on Time, Frequency and Dating in Geomorphology, Tatranská Lomnica-Stará Lesná, Czechoslovakia, June 16-21, 1992, Bratislava, Slovak Academy of Sciences, Institute of Geography, 1992, 83p., 77 refs. For abstracts of papers to this conference see 46-4838.
Stankoviansky, M., ed, Lacika, J., ed.
Alpine glaciation, Geomorphology, Geochronology, Stratigraphy, Soil dating, Age determination, Glacial geology, Quaternary deposits, Czechoslovakia—Carpathian Mountains.

46-4838
Abstracts of papers.
International Symposium on Time, Frequency and Dating in Geomorphology, Tatranská Lomnica-Stará Lesná, Czechoslovakia, June 16-21, 1992, Bratislava, Slovak Academy of Sciences, Institute of Geography, 1992, 51p., For excursion guide book to this conference see 46-4837.
Stankoviansky, M., ed.
Alpine glaciation, Geomorphology, Geochronology, Stratigraphy, Age determination, Czechoslovakia—Carpathian Mountains.

46-4839
Freezing and ice structure formed in protein gels.
Miyawaki, O., et al, *Bioscience, biotechnology, and biochemistry*, June 1992, 56(6), p.953-957, 10 refs.
Abe, T., Yano, T.
Ice formation, Ice structure, Freezing front, Dendritic ice, Ice crystal growth, Ice heat flux, Cryobiology.

46-4840
Cold adaptation.
Clarke, A., *Journal of zoology, London*, 1991, Vol.225, p.691-699, 36 refs.
Cryobiology, Cold tolerance, Acclimatization, Antifreezes, Physiological effects.
In general terms, cold adaptation is defined as follows: it encompasses all those aspects of an organism's anatomy, physiology, biochemistry and behavior that allow it to survive in low temperature environments such as polar and alpine regions. Cold adaptation is thus essentially no more than a specific example of the more general adaptation any organism must have to the particular thermal features of its environment, and polar fish are cold adapted in the same sense that fish living on a tropical reef are warm adapted. The literature of temperature physiology in relation to cold tolerance and cold adaptation is reviewed, combining where possible historically important references with recent reviews.

46-4841
Atmospheric and space research from the polar regions.
Rycroft, M.J., *Physics education*, 1991, Vol.26, p.153-158.
Polar atmospheres, Atmospheric physics, Atmospheric circulation, Atmospheric composition, Ozone, Solar activity.
The polar regions are unique laboratories for carrying out research on both the atmosphere and the near-Earth space environment. The relatively undisturbed conditions help us explore phenomena like the greenhouse effect and the springtime antarctic ozone depletion, the so-called ozone hole. Further out, UV and x-radiation from the Sun produce the Earth's ionosphere, vital for man's communication network. Yet satellite and polar research is showing us how events on the Sun can adversely affect this near-Earth space environment.

46-4842
Oceanography on a global scale: the new challenge.
Woods, J., *Physics education*, 1991, Vol.26, p.159-163,168.
Ocean currents, Air water interactions, Global change.
The ocean plays a central role in medium and long term climate change. In order to meet the urgent need to update the existing data base, the World Ocean Circulation Experiment (WOCE) has been launched. Meanwhile, assimilation of data into mathematical models– such as the Fine Resolution Antarctic Model (FRAM)– enables oceanographers to take account of non-linearity in oceanic flow, and this new approach is already yielding greatly improved simulations.

46-4843
ANARE antarctic field manual, 4th ed.
Australian National Antarctic Research Expeditions, Kingston, Tasmania, 1992, 198p.
Potter, S.A., ed.
Cold weather survival, Safety, Rescue operations, Traverses, Clothing, Portable equipment, Portable shelters, Manuals, Antarctica.
This manual describes procedures and equipment for avoiding or surviving life threatening hazards in antarctic field work. A list and brief description of Australian stations and bases in Antarctica is provided. Instructions are included for travel on land or sea ice by foot, ski, sled, small and heavy vehicles, helicopter and fixed wing aircraft, and small boats; for provision of clothing, shelter, and rations; for navigation and radio communications; for what to do if lost on land or stranded on ice floes; for aircraft and boating emergencies; and for rescue of personnel and vehicles from crevasses or thin ice.

46-4844
Present state of, and trends displayed by, the glaciers of Bennett Island in the past 40 years.
Verkulich, S.R., et al, *Polar geography and geology*, Jan-Mar. 1992, 16(1), p.51-57, 3 refs. For Russian original see 46-3417.
Krusanov, A.G., Anisimov, M.A.
Glaciation, Glacier surveys, Glacier mass balance.

46-4845
Cirques and glaciers in the Tenianyy Range, Chukotka.
Sedov, R.V., *Polar geography and geology*, Jan-Mar. 1992, 16(1), p.58-64, 4 refs. For Russian original see 46-3409.
Glacier surveys, Cirque glaciers, Glacier ablation.

46-4846
Origin of the ground ice in the Malyk-Sien Basin, northeastern USSR.
Zamoruev, V.V., *Polar geography and geology*, Jan-Mar. 1992, 16(1), p.65-71, Translation of Materialy gliatsiologicheskikh issledovanii, No.71:149-153, 1991. 7 refs.
Ground ice, Soil structure, Solifluction.

46-4847
Evidence for basal marine ice in the Filchner-Ronne ice shelf.
Oerter, H., et al, *Nature*, July 30, 1992, 358(6385), p.399-401, 18 refs.
Sea ice, Ice shelves, Ice formation, Antarctica—Filchner Ice Shelf, Antarctica—Ronne Ice Shelf.
The Filchner-Ronne Ice Shelf, which drains most of the marine-based portions of the West Antarctic ice sheet, is the largest ice

shelf on Earth by volume. The origin and properties of the ice that constitutes this shelf are poorly understood, because a strong reflecting interface within the ice and the diffuse nature of the ice-ocean interface make seismic and radio echo sounding data difficult to interpret. Ice in the upper part of the shelf is of meteoric origin, but is has been proposed that a basal layer of saline ice accumulates from below. Here the authors present the results of an analysis of the physical and chemical characteristics of an ice core drilled almost to the bottom of the Ronne Ice Shelf. The authors observe a change in ice properties at about 150 m depth, which is ascribed to a change from meteoric ice to basal marine ice. The basal ice is very different from sea ice formed at the ocean surface, and suggests a formation mechanism in which ice platelets in the water column accrete to the bottom of the ice shelf.

46-4848
Report on the geomorphological, geological, geodetic, and glaciological fieldwork in the Sör Rondane Mountains, 1990/91 summer (JARE-32).
Iwata, S., et al, *Antarctic record*, Nov. 1991, 35(3), p.355-401, In Japanese with English summary. 15 refs.
Geodetic surveys, Geological surveys, Glaciology, Logistics, Cold weather operation, Antarctica - Sör Rondane Mountains.
The Sör Rondane field party (JARE-32) carried out its research in the central area of the Sör Rondane Mountains, from Dec. 24, 1990 to Feb. 7, 1991. The field trip consisted of 2 parties traveling from mountain to mountain to shift tented camps using 4 snow vehicles towing their equipment. Nine snowmobiles (motor toboggans) were used for field research on glaciers. Geomorphologists carried out measurements in the periglacial field experimental sites, observations of rock weathering, and mapping of chronological sequence of tills and moraines. Geologists studied chronological sequence of rock formation and collected rock specimens for structural, petrological, and chemical analyses. A surveyor set up geodetic control stations using the GPS satellite positioning system, and made gravity surveys on glaciers as well as at some control stations. Two Belgian glaciologists took part in the fieldwork as exchange scientists and studied the dynamics of glacier movement and ice thickness. (Auth. mod.)

46-4849
Low temperature strength of metal-FRP bonded joints.
Mori, T., et al, *Japanese Society of Mechanical Engineers. International journal -Ser.1*, Apr. 1991, 34(2), p.257-263, 11 refs.
Yu, Q., Takahana, S., Shiratori, M.
Joints (junctions), Thermal analysis, Composite materials, Low temperature tests, Thermal stresses, Ultimate strength, Design criteria, Temperature effects, Physical properties.

46-4850
Maximum snowfall at long-term stations in the U.S.-/Canadian Great Lakes.
Bolsenga, S.J., et al, *Natural hazards*, May 1992, 5(3), p.221-232, 15 refs.
Norton, D.C.
Snowfall, Snow accumulation, Records (extremes), Periodic variations, Statistical analysis, Meteorological data, Weather forecasting, Design criteria, Lake effects.

46-4851
Comparison of Lanzhou loess profile with Vostok ice core in Antarctica over the last glaciation cycle.
Li, J.J., et al, *Science in China. Series B*, Apr. 1992, 35(4), p.476-487, 17 refs.
Loess, Soil profiles, Pleistocene, Paleoclimatology, Ice dating, Soil dating, Quaternary deposits, Correlation, Ice cores, Antarctica—Vostok Station.
Loess near Lanzhou from the late Pleistocene was very sensitive to climatic fluctuations. The Beiyuan terrace profile in Linxia City, whose curve of susceptibility tallies with the trend of isotopic curves of the Vostok ice core in Antarctica, is 35 m thick. There are five layers of paleosols under Malan loess. The upper three layers correspond to three warm stages in the last interglaciation. Interstadial of Last Glacial (C stage in the antarctic ice core) was clearly recorded in the Beiyuan profile, in which three layers of paleosols and two of loess were formed. The lowest section of the profile belongs to the penultimate glaciation, in which fossils of cold-drought-resistant mammals and molluses have been discovered. In this paper, these soil profiles are correlated with dates of antarctic ice cores in an effort to define present understanding of continental variations in paleoclimate and glaciation. (Auth. mod.)

46-4852
Lake ice records used to detect historical and future climatic changes.
Robertson, D.M., et al, *Climatic changes*, Aug. 1992, 21(4), p.407-427, 27 refs.
Ragotzkie, R.A., Magnuson, J.J.
Lake ice, Climatic changes, Meteorological data, Freezeup, Ice breakup, Air temperature, Periodic variations, Ice forecasting, Correlation, Global warming.

46-4853
Effects of nutritional factors on frost hardening in *Larix leptolepis* (Sieb & Zucc.) Gord.
Hansen, J.M., *Scandinavian journal of forest research*, 1992, 7(2), p.183-192, 38 refs.
Trees (plants), Frost resistance, Acclimatization, Freeze thaw tests, Plant physiology, Cold weather tests, Cold stress, Forestry.

46-4854
Ultra-high gas pressure pipelines offer advantages for arctic service.
King, G., *Oil & gas journal*, June 1, 1992, 90(22), p.79-84, 8 refs.
Gas pipelines, Cold weather performance, Natural gas, Design, Vapor pressure, Frost heave, Thermodynamic properties, Permafrost heat transfer, Mass flow.

46-4855
Northern ozone hole deemed likely.
Monastersky, R., *Science news*, Feb. 8, 1992, 141(6), p.84.
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46-4856
Cirrus microphysics and radiative transfer: cloud field study on 28 October 1986.
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Cloud physics, Remote sensing, Radiation balance, Ice crystal optics, Particle size distribution, Backscattering, Optical properties, Infrared radiation, Solar radiation.

46-4857
Deicing salt compatibility with vegetation.
Priebe, L.V., *Public works*, Apr. 1990, 121(4), p.48-49.
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46-4858
Strategic planning for snow and ice control using computer-based routing software.
Evans, J.R., et al, *Public works*, Apr. 1990, 121(4), p.60-64.
Weant, M.
Road icing, Salting, Road maintenance, Municipal engineering, Route surveys, Computer applications.

46-4859
Fine tuning CMA for corrosion control.
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Wyatt, J.
Road icing, Chemical ice prevention, Road maintenance, Environmental impact.

46-4860
Minnesota DOT tests deicing alternatives.
Fleege, E., *Public works*, July 1990, 121(8), p.58-59.
Road icing, Chemical ice prevention, Road maintenance, Environmental impact.

46-4861
Glacial landforms and Late Cenozoic history of the western Sör Rondane Mountains.
Moriwaki, K., et al, *Antarctic record*, Mar. 1992, 36(1), p.15-48, In Japanese with English summary. Refs. p.38-39.
Hirakawa, K.
Glacial deposits, Landforms, Ice sheets, Moraines, Ice cover thickness, Alpine glaciation, Pleistocene, Antarctica—Sör Rondane Mou..tains.
The western Sör Rondane Mountains, with the exception of several high peaks, were once covered by ice. The mountains are in some places covered with tills weathered in various degrees. Heavily weathered ground including Pliocene till is found on flat- topped surfaces of the mountains and glacial benches about 100 m higher than the present ice surface. Heavily weathered ground is found also in an ice-free valley, the bottom of which is lower than the surrounding ice surface. Tills of the early to middle Pleistocene are small in quantity, and form only small lateral moraines on the mountain flanks about 100 m higher than the present ice surface. Since the late Pleistocene, supraglacial tills have formed moraine fields around the mountains less than 10 m above the present ice surface. The Pliocene temperate ice sheet produced, transported and deposited a large quantity of tills, and eroded the valley systems dividing the mountains into several blocks. The ice sheet shrank and most of the mountains emerged from ice by the latest Pliocene. The lowest level of the ice sheet during this deglaciation was probably lower than that of the present day. (Auth. mod.)

46-4862
Compressive ice model tests with a pusher plate attached to the carriage of the ice tank. Report from the joint Finnish- Soviet research project.
Kujala, P., et al, *Helsinki University of Technology. Laboratory of Naval Architecture and Marine Engineering. Report*, 1992, M-118, 39p., 1 ref.
Kuuskoski, J.
Ships, Ice pressure, Ice solid interface, Ice loads, Ice breaking, Ice cover strength, Ice navigation, Test chambers, Strain tests.

46-4863
Report on first expedition to glaciers and glacier lakes in the Pumqu (Arun) and Poiqu (Bhote-Sun Kosi) river basins, Xizang (Tibet), China. Sino-Nepalese investigation of glacier lake outburst floods in the Himalayas.
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Liu, C.H., ed, Sharmal, C.K., ed.
DLC GB2559.A78R47 1988
Glacier surveys, Glacial lakes, Lake bursts, Mountain glaciers, Glacial rivers, River basins, Water reserves, Expeditions, China -Xizang, Nepal.

46-4864
Seismic architecture and sedimentation in northwest Spitsbergen fjords.
Sexton, D.J., et al, *Marine geology*, Jan. 1992, 103(1-3), p.53-68, 26 refs.
Dowdeswell, J.A., Solheim, A., Elverhöi, A.
Bottom sediment, Glacial deposits, Sedimentation, Seismic surveys, Marine geology, Pleistocene, Glacier oscillation, Glacial hydrology, Bottom topography.

46-4865
Model for calculating the thermal conductivity of soils with their genesis taken into account.
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Soil temperature, Snow temperature, Thermal conductivity, Porosity, Soil air interface, Physical properties, Mathematical models, Particles.

46-4866
Glaciers.
Knight, P.G., *Progress in physical geography*, Mar. 1992, 16(1), p.85-89, 31 refs.
Glaciology, Geography, Geomorphology, Glaciers.

46-4867
Ice faura in the shallow southwestern Beaufort Sea, Arctic Ocean.
Carey, A.G., Jr., *Journal of marine systems*, June 1992, 3(3), p.225-236, 35 refs.
Sea ice, Ice composition, Marine biology, Ecology, Ice bottom surface, Fast ice, Distribution, Algae, Seasonal variations.

46-4868
Steady-state suspension of snow.
Pomeroy, J.W., et al, *Journa, of hydrology*, Aug. 1992, 136(1-4), p.275-301, 36 refs.
Male, D.H.
Blowing snow, Air entrainment, Mass transfer, Snow air interface, Wind factors, Sublimation, Turbulent diffusion, Atmospheric physics, Mathematical models.

46-4869
Inclusion of ice cover in a storm surge model for the Beaufort Sea.
Danard, M.B., et al, *Natural hazards*, 1989, 2(2), p.153-171, 19 refs.
Sea ice distribution, Ice water interface, Storms, Ocean waves, Sea level, Water level, Ice cover effect, Wind factors, Flood forecasting, Mathematical models.

46-4870
Fuzzy factorial analysis of snow avalanches.
Jaccard, C., *Natural hazards*, 1990, 3(4), p.329-340, 16 refs.
Avalanche forecasting, Avalanche mechanics, Classifications, Physical properties, Forest land, Correlation, Analysis (mathematics), Human factors, Safety.

46-4871
Results of analyses of Mizuho 700 m ice core, East Antarctica. Part 1. Delta 0-18, microparticles, ECM (acidity), pH, major ions.
Watanabe, O., et al, *Japanese Antarctic Research Expedition. JARE data reports*, Mar. 1992, No.181, 79p., 17 refs.
Fujii, Y., Motoyama, H.
Ice cores, Ice composition, Electrical resistivity, Chemical analysis, Antarctica Mizuho Station.
In 1983-1984, glaciological survey parties of the 24th and 25th Japanese Antarctic Research Expedition (JARE) carried out ice-coring down to a depth 700.56 m at Mizuho Station. The results of core analysis were published in many journals (see

references), but they dealt mainly with the physical analysis of the core. This volume presents the data of delta O-18, microparticles, ECM (acidity), pH and major ions. Analytical procedures are described.

46-4872
UV radiation and photosynthetic production in antarctic sea ice microalgae.
Ryan, K.G., *Journal of photochemistry and photobiology*, May 15, 1992, 13(3-4), p.235-240, 20 refs.
Sea ice, Algae, Ultraviolet radiation, Photosynthesis, Antarctica--McMurdo Sound.
During spring when ozone depletion is at its maximum, up to 10% of the surface UV radiation may penetrate antarctic sea ice to the algal community growing at the lower surface. These algae ultimately form a major portion of the food web in the southern ocean, and reduction in productivity due to enhanced UV radiation may have serious implications for all marine life. The small (5%) but statistically significant reduction in photosynthetic production observed as a result of UV treatment of ice microalgae indicates that the effect on these algae at least may not be as drastic as sometimes predicted. (Auth.)

46-4873
Correlations between trace metal concentrations (Cd, Cu, Pb, Zn) in sea water and zooplankton organisms (Copepoda) of the Arctic and Atlantic Oceans.
[Wechselbeziehungen zwischen Spurenmetallkonzentrationen (Cd, Cu, Pb, Zn) im Meerwasser und in Zooplanktonorganismen (Copepoda) der Arktis und des Atlantiks],
Pohl, C., *Berichte zur Polarforschung*, 1992, No.101, 198p. + additional tables, In German with English summary. Refs. p.186-198.
Sea water, Chemical composition, Metals, Nutrient cycle, Greenland Sea, Fram Strait, Arctic Ocean.

46-4874
Thunderstorm charging: calculations of the effect of ice crystal size and graupel velocity.
Mitzeva, R., et al, *Journal of atmospheric and terrestrial physics*, Apr. 1990, 52(4), p.241-245, 20 refs.
Saunders, C.P.R.
Charge transfer, Ice crystal size, Cloud electrification, Snow pellets, Models.

46-4875
Review of steel standards used in Canada—arctic regions.
Ferreyra, B., Montreal, Bureau Veritas, 1991, 82p. + appends., 21 refs.
Steels, Frost resistance, Cold weather performance, Steel structures, Ships, Ice solid interface, Building codes, Standards.

46-4876
Prediction of non-linear bending moments and vertical accelerations in waves of an icegoing ore-carrier.
Meyerhoff, K., et al, Hamburg, MTG Marinetechnik GmbH, 1983, 16p. + appends., In English with appendices in German.
Schlachter, G.
Ships, Ice navigation, Ocean waves, Simulation.

46-4877
Final report on the winter trials of CCGS *Alexander Henry*.
Bulat, V., et al, Kanata, Ontario, Arctec Canada Limited, 1980, Var. p. FR-582B.
Blount, H.
Icebreakers, Ice loads, Ice breaking, Ice navigation, Ice solid interface, Metal ice friction, Tests, Cold weather performance, Statistical analysis.

46-4878
Field tests on ice indentation at medium scale ice island, April 1989.
Frederking, R.M.W., *National Research Council Canada. Institute for Research in Construction. Client report*, Oct. 1990, CR-5866.1, 70p. + append.
Ice islands, Ice pressure, Ice solid interface, Ice loads, Ice deformation, Ice cover strength, Impact tests, Penetration tests.

46-4879
Position, elevation, ice thickness and bedrock elevation of stations along the routes in East Queen Maud Land and Enderby Land, East Antarctica.
Watanabe, O., et al, *Japanese Antarctic Research Expedition. JARE data reports*, Mar. 1992, No.180, 143p., 12 refs.
Fujii, Y., Nishio, F., Motoyama, H.
Traverses, Ice cover thickness, Bedrock, Altitude, Antarctica--Queen Maud Land, Antarctica--Enderby Land.
This volume contains data obtained during oversnow traverses carried out by the Japanese Antarctic Research Expedition in East Antarctica. A route map is provided, and information concerning surface elevation, ice thickness and bedrock elevation measured along the routes is presented in tables.

46-4880
Arctic ocean record: key to global change (Initial Science Plan).
Thiede, J., ed, *Polarforschung*, 1991 (Publ. 1992), 61(1), p.1-102, With German summary. Refs.p.70-76.
Nansen Arctic Drilling Program NAD Science Committee.
Paleoclimatology, Geography, Sea ice, Ice cover, Offshore drilling, Drill core analysis, Marine geology, Geologic structures, Oceanography, Arctic Ocean.

46-4881
Expeditions of the RV *Polarstern* in 1990/91, ANTARKTIS IX/1-4. [Die Expeditionen ANTARKTIS/IX/1-4 des Forschungsschiffes *Polarstern* 1990/91],
Bathmann, U., ed, *Berichte zur Polarforschung*, 1992, No.100, 403p., In German and English with summaries in both languages. Refs. passim.
Expeditions, Hydrography, Sea ice, Plankton, Sea water, Chemical composition, Sediments, Antarctica—Weddell Sea, Antarctica—King George Island.
The ninth research cruise of RV *Polarstern* to the Antarctic (ANT IX) consisted of 4 legs. The first leg addressed chemical interactions between ocean and atmosphere during the southward voyage. The second leg carried out investigations of the Weddell Gyre within the framework of the World Ocean Circulation Experiment (WOCE). The third leg was planned as a broad-based interdisciplinary study of the hitherto unexplored southwestern Weddell Sea, but had to be reorganized with a new scientific program for the Lazarev Sea because of exceptionally heavy ice conditions in the Weddell Sea. On several transects along the shelf and into the deep sea, all disciplines participating on this cruise - oceanography, biology and geology - investigated in closely interlocked programs the water mass distribution and water chemistry as well as the morphology of the sea floor and composition of the sediments. The fourth leg departed from Cape Town on Mar. 30 and proceeded to Bouvet I. The aim of this predominantly geological leg was to map and sample submarine elevations: the Agulhas Ridge, the Meteor Rise and the eastern flank of the southernmost Mid-Atlantic Ridge, in order to refine existing models of the paleoceanography of the South Atlantic. *Polarstern* returned to Bremerhaven on May 13, 1991. (Auth. mod.)

46-4882
Year-round ecophysiological study of *Himantothallus grandifolius* (Desmarestiales, Phaeophyta) at Signy Island, Antarctica.
Drew, E.A., et al, *Phycologia*, May/July 1992, 31(3/4), p.262-277, 32 refs.
Hastings, R.M.
Plankton, Algae, Sea ice, Physiological effects, Signy Island.
Field studies carried out on the antarctic brown macroalga *Himantothallus grandifolius* (A. Gepp et E.S. Gepp) A.D. Zinova (Desmarestiales, Phaeophyta) during two summers and the intervening winter season are described. Monitoring of plant growth by the punched-hole technique shows that elongation of the lamina stops a month before the onset of fast sea-ice in the austral autumn, but begins again a month before sea-ice breakout. *In situ* photosynthesis measurements carried out at 2-week intervals show that net carbon accretion also ceases as early as March, two months prior to formation of the sea-ice, and recommences before sea-ice break-out. A short period of high carbon accretion occurs immediately after the ice has gone, but this soon decreases abruptly due to reduction of underwater irradiance by a dense phytoplankton bloom during mid-summer. The high rates of carbon accretion do not recommence even after the bloom decays, because water clarity is by then dramatically reduced by terrestrial run-off and turbid glacial melt-water. Nutrient levels are sufficiently high throughout the year to support maximal rates of macroalgal photosynthesis, but water temperature seldom reaches even 1 C, resulting in relatively low metabolic rates. However, these are still sufficient to produce photosynthetic rates up to 9 micrograms C/sq cm/h at a saturation irradiance of 10 W/sq m, and carbon loss due to dark respiration of up to 2 micrograms C/sq cm/h. (Auth.)

46-4883
Hydrologic modeling of protective barriers: comparison of field data and simulation results.
Fayer, M.J., et al, *Soil Science Society of America. Journal*, May-June 1992, 56(3), p.690-700, 25 refs.
Rockhold, M.L., Campbell, M.D.
Waste disposal, Soil water migration, Protection, Covering, Water storage, Seepage, Water balance, Snow cover effect, Computerized simulation, Radioactive wastes, Layers, Soil science.

46-4884
Evaluation of models for estimation of net radiation for alpine sloping surfaces.
Huo, Z.H., et al, *Acta meteorologica sinica*, 1992, 6(2), p.189-197, 24 refs.
Bailey, W.G.
Alpine landscapes, Solar radiation, Radiation balance, Slope orientation, Topographic effects, Radiance, Mathematical models, Cloud cover.

46-4885
Preliminary study of snow mass variations in China over the past 30 years.
Li, P.J., *Acta meteorologica sinica*, 1992, 6(2), p.231-237, 11 refs.
Snow accumulation, Snow depth, Mass balance, Periodic variations, Carbon dioxide, Climatic changes, Global warming, Climatology.

46-4886
Vibrations of hydrogen bonds.
Tomkinson, J., *Spectrochimica acta*, Mar. 1992, 48A(3), p.329-348, 46 refs.
Hydrogen bonds, Molecular energy levels, Water structure, Vibration, Molecular structure, Neutron scattering, Ice structure, Spectra, Ice spectroscopy.

46-4887
Forecasting the attenuation statistics of radio waves in snowfalls.
Pozhidaev, V.N., *Soviet journal of communications technology & electronics*, July 1992, 37(7), p.135-140, Translated from Radiotekhnika i elektronika, 1992, No.1, 12 refs.
Radio waves, Wave propagation, Attenuation, Falling snow, Snowflakes, Snow optics, Telecommunications, Physical properties, Statistical analysis.

46-4888
Remote measurements of supercooled integrated liquid water during WISP/FAA aircraft icing program.
Stankov, B.B., et al, *Journal of aircraft*, July-Aug. 1992, 29(4), p.604-611, 18 refs.
Westwater, E.R., Snider, J.B., Weber, R.L.
Aircraft icing, Remote sensing, Cloud physics, Supercooled clouds, Water content, Radiometry, Ice forecasting, Sounding, Microwaves, Research projects.

46-4889
Assessment of one-dimensional icing forecast model applied to stratiform clouds.
Tunick, A., et al, *Journal of aircraft*, July-Aug 1992, 29(4), p.703-706, 14 refs.
Rachele, H.
Aircraft icing, Ice forecasting, Cloud physics, Water content, Cloud droplets, Temperature effects, Mathematical models, Physical properties, Supercooled clouds.

46-4890
Advanced pneumatic impulse ice protection system (PIIP) for aircraft.
Martin, C.A., et al, *Journal of aircraft*, July-Aug. 1992, 29(4), p.714-716, 4 refs.
Putt, J.C.
Aircraft icing, Ice removal, Covering, Inflatable structures, Mechanical properties, Design, Protection, Airborne equipment, Performance.

46-4891
Air-void system parameters and freeze-thaw durability of concrete containing superplasticizers.
Attiogbe, E.K., et al, *Concrete international*, July 1992, 14(7), p.57-61, 30 refs.
Nmai, C.K., Gay, F.T.
Concrete durability, Concrete admixtures, Frost resistance, Freeze thaw cycles, Porosity, Air entrainment, Freezing rate, Design criteria, Surface properties.

46-4892
Digital analysis of low-relief topography in a Landsat snow-cover scene in south-central Alberta.
Skoye, K.R., et al, *Canadian journal of remote sensing*, July 1992, 18(3), p.143-150, With French summary. 31 refs.
Eyton, J.R.
Landforms, Topographic features, Remote sensing, Subsurface structures, Snow cover effect, Image processing, Photometry, LANDSAT, Radiance, Radiometry, Slope orientation.

46-4893
Methane flux transect along the trans-Alaska pipeline haul road.
Whalen, S.C., et al, *Tellus*, July 1990, 42B(3), p.237-249, 37 refs.
Reeburgh, W.S.
Tundra, Taiga, Wetlands, Natural gas, Sampling, Soil air interface, Atmospheric composition, Vapor transfer, Traverses, Vegetation patterns, Climatic changes.

46-4894
Radiation balance at Goldberggletscher (Hohe Tauern). [Strahlungshaushaltsuntersuchungen am Goldberggletscher (Hohe Tauern)],
Schöner, W., *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(2), p.147-173, In German with English summary. 18 refs.
Glacier ablation, Radiation absorption, Radiation balance, Albedo, Photointerpretation, Topographic features, Correlation, Snow cover distribution, Solar radiation.

46-4895
Lichenometry of neoglacial moraines in Lewis and Tyndall cirques on Mount Kenya, East Africa.
Mahaney, W.C., et al, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(2), p.175-186, With German summary. 42 refs.
Spence, J.R.
Quaternary deposits, Glacial geology, Moraines, Lichens, Soil dating, Paleoclimatology, Glacier oscillation, Cirque glaciers, Sediment transport.

46-4896
Strain rates of a 25 m deep firn pit in an alpine glacier and a related constitutive equation of temperate firn (Kesselwandferner, Oetztal Alps, 1983-1989).
Ambach, W., et al, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(2), p.187-198, With German summary. 10 refs.
Eisner, H., Huber, J., Schneider, H.
Glacier flow, Flow measurement, Firn, Ice deformation, Strains, Snow density Analysis (mathematics), Ice volume.

46-4897
Report on the extent of some Quaternary glaciers in the Japanese Alps, Honshu (Hakuba, Tateyama).
Heuberger, H., et al, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(2), p.199-208, With German summary. 5 refs.
Kerschner, H.
Alpine glaciation, Pleistocene, Moraines, Quaternary deposits, Glacier oscillation, Geomorphology.

46-4898
One hundred years of observations of Minapin Glacier, Hunza Karakoram. [Seit 100 Jahren Beobachtungen am Minapingletscher im Hunzakarakorum],
Finsterwalder, R., *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(2), p.209-216, In German with English summary. 13 refs.
Glacier oscillation, Periodic variations, Glacier surveys, Photogrammetry, Forecasting.

46-4899
Glaciers of the Austrian Alps—1987/88. [Die Gletscher der österreichischen Alpen 1987/88],
Patzelt, G., *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(2), p.217-230, In German.
Glacier oscillation, Glacier mass balance, Periodic variations, Glacier surveys.

46-4900
Survey of the field of the Pasterze (Glocknergruppe) in 1988. [Nachmessungen im Bereich der Pasterze (Glocknergruppe) im Jahre 1988],
Wakonigg, H., *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1989, 25(2), p.231-237, In German.
Glacier mass balance, Glacier oscillation, Firn, Glacier surveys, Periodic variations.

46-4901
Atmospheric CO2: global change and regulation mechanisms.
Oeschger, H., *Berichte der Bunsen-Gesellschaft für Physikalische Chemie*, Mar. 1992, 96(3), p.252-257, 23 refs. Presented at Discussion Meeting of the journal: Physics and Chemistry of the Atmosphere, Schliersee, Bavaria, Oct. 7-9, 1991.
Atmospheric composition, Carbon dioxide, Global change, Climatic changes, Ice cores, Drill core analysis, Periodic variations.
Models for the CO2 uptake by the carbon system have been developed which are capable of reproducing the result of the drop in the rate of increase of CO2 emissions from 4.5% to 2% per year following the oil embargo in 1973. Of special interest regarding the understanding of the carbon cycle and its role in controlling the climate of the Earth are the observations in polar ice cores covering the past 160,000 years, corresponding to one and a half glaciation cycles. They show variations of atmospheric CO2, CH4 and N2O parallel to the climatic variations. Measurements of C-13/C-12 in shells of foraminiferas support the hypothesis that these CO2 changes are caused by changes in the ocean's biological pump, i.e. the flux of detrital organic carbon from the surface to the deep ocean, which affects the total inorganic carbon in the surface ocean and the partial pressure of CO2. (Auth. mod.)

46-4902
Observation of global stratospheric ozone change.
Stolarski, R.S., *Berichte der Bunsen-Gesellschaft für Physikalische Chemie*, Mar. 1992, 96(3), p.257-263, 35 refs. Presented at Discussion Meeting of the journal: Physics and Chemistry of the Atmosphere, Schliersee, Bavaria, Oct. 7-9, 1991.
Atmospheric composition, Polar atmospheres, Ozone, Global change, Atmospheric density, Seasonal variations, Sampling, Photochemical reactions.
Measurements of the total column amount of ozone from the Total Ozone Mapping Spectrometer (TOMS) on the Nimbus 7 satellite have now been made for 13 years. They show that the 1991 antarctic ozone hole again had a pronounced minimum in early October, indicating deep ozone holes in four the last five years. Globel scale measurements by TOMS show no trend in total ozone near the equator, but a significant trend at northern middle and high latitudes. This trend has a pronounced seasonal variation with maximum in winter. The observed trend is significantly larger than the predictions of gas-phase photochemical models. (Auth. mod.)

46-4903
Column amounts and some information on the vertical distribution of trace gases in the late north polar winter 1990.
Adrian, G.P., et al, *Berichte der Bunsen-Gesellschaft für Physikalische Chemie*, Mar. 1992, 96(3), p.272-276, 20 refs. Presented at Discussion Meeting of the journal: Physics and Chemistry of the Atmosphere, Schliersee, Bavaria, Oct. 7-9, 1991.
Polar atmospheres, Atmospheric composition, Ozone, Chemical properties, Stratosphere, Infrared spectroscopy, Heterogeneous nucleation.

46-4904
Stratospheric ozone variability over Spitsbergen in March-April 1991.
Rummukainen, M., et al, *Berichte der Bunsen-Gesellschaft für Physikalische Chemie*, Mar. 1992, 96(3), p.277-280, 5 refs. Presented at Discussion Meeting of the journal: Physics and Chemistry of the Atmosphere, Schliersee, Bavaria, Oct. 7-9, 1991.
Joffre, S.M., Damski, J., von der Gathen, P.
Polar atmospheres, Atmospheric composition, Ozone, Air temperature, Atmospheric density, Sounding, Seasonal variations, Advection.

46-4905
Gaseous sulfuric acid and sulfur dioxide measurements in the arctic troposphere and lower stratosphere: implications for hydroxyl radical abundances.
Möhler, O., et al, *Berichte der Bunsen-Gesellschaft für Physikalische Chemie*, Mar. 1992, 96(3), p.280-283, 21 refs. Presented at Discussion Meeting of the journal: Physics and Chemistry of the Atmosphere, Schliersee, Bavaria, Oct. 7-9, 1991.
Arnold, F.
Polar atmospheres, Sampling, Atmospheric composition, Chemical properties, Aerial surveys, Air pollution, Stratosphere.

46-4906
Supercooled sulfuric acid droplets: perturbed stratospheric chemistry in early winter.
Turco, R.P., et al, *Berichte der Bunsen-Gesellschaft für Physikalische Chemie*, Mar. 1992, 96(3), p.323-334, 63 refs. Presented at Discussion Meeting of the journal: Physics and Chemistry of the Atmosphere, Schliersee, Bavaria, Oct. 7-9, 1991.
Hamill, P.
Cloud physics, Air pollution, Atmospheric composition, Supercooling, Cloud droplets, Heterogeneous nucleation, Aerosols, Atmospheric density, Ozone, Chemical properties.

46-4907
Maximum supercooling of H2SO4 acid aerosol droplets.
Luo, B.P., et al, *Berichte der Bunsen-Gesellschaft für Physikalische Chemie*, Mar. 1992, 96(3), p.334-338, 28 refs. Presented at Discussion Meeting of the journal: Physics and Chemistry of the Atmosphere, Schliersee, Bavaria, Oct. 7-9, 1991.
Peter, T., Crutzen, P.J.
Cloud physics, Cloud droplets, Heterogeneous nucleation, Chemical properties, Supercooling, Aerosols, Freezing points, Ozone, Atmospheric density.

46-4908
Stratospheric aerosol increases and ozone destruction: implications from mass spectrometer measurements.
Arnold, F., *Berichte der Bunsen-Gesellschaft für Physikalische Chemie*, Mar. 1992, 96(3), p.339-350, 41 refs. Presented at Discussion Meeting of the journal: Physics and Chemistry of the Atmosphere, Schliersee, Bavaria, Oct. 7-9, 1991.
Atmospheric composition, Cloud physics, Aerosols, Ozone, Photochemical reactions, Heterogeneous nucleation, Stratosphere, Supercooling, Chemical properties, Sampling.

46-4909
LIDAR measurements of stratospheric aerosols in the Arctic.
Neuber, R., et al, *Berichte der Bunsen-Gesellschaft für Physikalische Chemie*, Mar. 1992, 96(3), p.350-353, 10 refs. Presented at Discussion Meeting of the journal: Physics and Chemistry of the Atmosphere, Schliersee, Bavaria, Oct. 7-9, 1991.
Beyerle, G., Schrems, O.
Polar atmospheres, Stratosphere, Atmospheric composition, Aerosols, Lidar, Air temperature, Remote sensing, Chemical properties, Backscattering, Volcanic ash.

46-4910
Numerical modelling of the sedimentation of polar stratospheric cloud particles.
Müller, R., et al, *Berichte der Bunsen-Gesellschaft für Physikalische Chemie*, Mar. 1992, 96(3), p.353-361, 38 refs. Presented at Discussion Meeting of the journal: Physics and Chemistry of the Atmosphere, Schliersee, Bavaria, Oct. 7-9, 1991.
Peter, T.
Cloud physics, Atmospheric density, Heterogeneous nucleation, Aerosols, Scavenging, Sedimentation, Mathematical models, Ozone, Particle size distribution, Computerized simulation.

46-4911
Micro-physical box model for EASOE: preliminary results for the January/February 1990 PSC event *over Kiruna*.
Peter, T., et al, *Berichte der Bunsen-Gesellschaft für Physikalische Chemie*, Mar. 1992, 96(3), p.362-367, 28 refs. Presented at Discussion Meeting of the journal: Physics and Chemistry of the Atmosphere, Schliersee, Bavaria, Oct. 7-9, 1991.
Polar atmospheres, Cloud physics, Aerosols, Heterogeneous nucleation, Ice formation, Chemical properties, Ozone, Air pollution, Mathematical models.

46-4912
Global changes of aerosols—ground based monitoring of the optical thickness in polar regions and central Europe.
Leiterer, U., et al, *Berichte der Bunsen-Gesellschaft für Physikalische Chemie*, Mar. 1992, 96(3), p.377-380, 9 refs. Presented at Discussion Meeting of the journal: Physics and Chemistry of the Atmosphere, Schliersee, Bavaria, Oct. 7-9, 1991.
Weller, M., Herber, A.
Photometry, Polar atmospheres, Atmospheric density, Optical properties, Air pollution, Global change, Atmospheric circulation, Volcanic ash.
Optical thickness measurements in north polar, south polar and central European regions are presented and discussed in comparison with earlier values. Actinometer measurements of the integral optical thickness in the Arctic (Franz-Joseph-Land) from 1933 to 1942 show an average level of about 0.22 and only minor changes between spring and summer and from year to year. Since 1955 the spring values show a pronounced increase to 0.3 in 1985. In contrast to this behavior, the levels in Antarctica (Mirny) are much lower (around 0.18) and fairly stable between 1957 and 1990 except for two time periods with strong volcanic activities with peaks up to 0.28. Spectral aerosol thickness data at 500 and 1000 nm for Antarctica from 1955 to 1990 indicate marked volcanic activity with data rising from a level around 0.03 to two maxima of about 0.12. In Mar 1989, the boundary layer extinction coefficient at 500 nm in the Arctic reached 79-fold of the Antarctic and 2.5-fold of the central Europe values at Lindenberg. The very high winter and spring aerosol extinction coefficients in the Arctic result from long-range transport and gas-to-particle conversion of NOx and SO2. (Auth. mod.)

46-4913
On the variability of the stratosphere in the arctic regions in winter.
Labitzke, K., *Berichte der Bunsen-Gesellschaft für Physikalische Chemie*, Mar. 1992, 96(3), p.496-501, 8 refs. Presented at Discussion Meeting of the journal: Physics and Chemistry of the Atmosphere, Schliersee, Bavaria, Oct. 7-9, 1991.
Polar atmospheres, Winter, Stratosphere, Air temperature, Heating, Wind direction, Atmospheric density, Ozone, Periodic variations, Solar radiation.

46-4914
Proceedings.
IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. 1992. 1205p. (2 vols.), Refs. passim. For individual papers see 46-4915 through 46-5010.
Ice cover strength, Ice deformation, Ice loads, Ice solid interface, Ice water interface, River ice, Ice pressure, Frazil ice, Ice control, Ice cracks, River flow, Ice jams, Ice formation, Ice thermal properties, Ice breaking.

46-4915
Frazil and skim ice formation in rivers.
Matoušek, V., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.1-22, 9 refs.
River ice, Frazil ice, Ice formation, Nucleation, Slush, Air ice water interaction, Heat flux, Mathematical models.

46-4916
Global warming: a polar approach.
Wadhams, P., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.23-40, 35 refs.
Global warming, Polar atmospheres, Air ice water interaction, Atmospheric circulation, Sea ice distribution, Ice cover thickness, Fast ice, Snow cover distribution.

46-4917
Engineering design choices for Great Lakes small craft harbors using a winter conditions classification system.
Wortley, C.A., MP 3115, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.41-48, 3 refs.
Ports, Cold weather operation, Ice control, Lake ice, Ice conditions, Docks, Site surveys, Data processing.
To aid designers in selecting among choices for the design of docks and other harbor structures, a Winter Conditions Classification System was presented at the 10th Ice Symposium. The conditions are ice thickness, water level fluctuation, water and air temperatures, winter duration, snowfall, ice sheet confinement and integrity, and miscellaneous site specific conditions. The classifications are mild, average and severe, and represent conditions that range between not too significant to very significant for design purposes. *This paper presents a matrix of* design choices which correspond with classified winter conditions at a given site. The small craft harbor design elements are: structural dockage systems, floating dockage systems, and removable dockage systems supplemented by ice control measures. Making the best engineering design choices for given winter conditions will result in safe, economical and long-lasting small craft harbor facilities.

46-4918
On a constitutive law for polycrystalline ice based on the concept of internal variables.
Pohé, J., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.49-60, 24 refs.
Bruhns, O.T.
Ice crystal structure, Ice deformation, Ice thermal properties, Ice elasticity, Dislocations (materials), Thermodynamic properties, Mathematical models.

46-4919
Hans Island experiments in a laboratory.
Timco, G.W., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.61-70, 11 refs.
Ice loads, Ice cover strength, Ice pressure, Ice floes, Ice solid interface, Offshore landforms, Offshore structures, Environment simulation, Impact tests.

46-4920
Field test of a surface-heated trash rack to prevent frazil ice blockage.
Daly, S.F., et al, MP 3116, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.71-77, 8 refs.
Haynes, F.D., Garfield, D.E., Clark, C.H.
River ice, Frazil ice, Ice prevention, Water intakes, Electric power, Electric heating.
The concept of heating only the leading edge of trash rack bars to efficiently prevent frazil ice blockage has been investigated. Proof-of-concept tests conducted in a laboratory flume proved to be successful in preventing blockage by frazil ice. A field test was then made at a small (143-kw) hydro plant. This field test was successful in greatly reducing frazil ice blockage. The total electrical power supplied was only 2.8 kw, or 0.26 kw/sq ft.

46-4921
Triaxial strength tests on laboratory grown saline ice under low confining pressure.
Kato, K., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.78-89, 6 refs.
Kishimoto, H., Mita, S.
Ice loads, Ice cover strength, Ice pressure, Salt ice, Ice solid interface, Compressive properties, Shear strength, Strain tests.

46-4922
Experimental investigations of river ice cover cracking.
Abdel-Zaher, A.K., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.90-103, 26 refs.
Davar, K.S., Dawe, J.L., Beltaos, S.
River ice, Ice cover strength, Ice cracks, Ice deformation, Ice breakup, Flexural strength, Strain tests.

46-4923
Floating ice as a problem to hydropower intakes.
Carstens, T., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.104-115, 10 refs.
Godtland, K., Tesaker, E.
River ice, Ice control, Water intakes, Sluices (hydraulic engineering), Electric power, Floating ice.

46-4924
Development of a new test apparatus to determine scraping loads for ice removal from pavements.
Nixon, W.A., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.116-127, 4 refs.
Chung, C.H.
Ice removal, Road maintenance, Road icing, Ice loads, Test equipment.

46-4925
Theoretical analysis of ice island loads upon a cylindrical rigid structure.
Lu, M.C., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.128-141, 15 refs.
Sackinger, W.M.
Ice islands, Ice loads, Ice solid interface, Offshore structures, Impact strength, Ice pressure, Ice floes, Hydrodynamics, Mathematical models.

46-4926
Systematic series tests in ice with icebreaking tanker models *(part I)*.
Kitagawa, H., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.142-151, 3 refs.
Koyama, K., Izumiyama, K., Uto, S.
Ice breaking, Ice navigation, Tanker ships, Ice loads, Ice solid interface, Metal ice friction, Environment simulation, Test chambers.

46-4927
Discrete modelling of grain scale deformation mechanisms for ice in compression.
McKenna, R.F., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.152-163, 11 refs.
Ice deformation, Ice creep, Ice pressure, Ice cover strength, Ice cracks, Ice loads, Ice elasticity, Mathematical models.

46-4928
Full-scale and model observation of ice breaking pattern on a Japanese patrol icebreaker *Soya*.
Yamaguchi, H., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.164-175, 22 refs.
Kurasawa, M., Kato, H.
Ice breaking, Ice navigation, Icebreakers, Ice loads, Ice solid interface, Metal ice friction, Environment simulation, Test chambers.

46-4929
Effect of snowcover on the resistance of ships in uniform level ice.
Wilkman, G., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.176-187, 6 refs.
Uuskallio, A.
Ice navigation, Metal snow friction, Ice cover effect, Snow loads, Snow ice interface.

46-4930
Numerical simulation of ice-cone interaction.
Izumiyama, K., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.188-199, 8 refs.
Kitagawa, H., Koyama, K., Uto, S.
Ice loads, Ice solid interface, Ice deformation, Ice pressure, Ice cover strength, Ice cracks, Mathematical models.

46-4931
Comparison of crack initiation conditions for columnar-grain and granular ice.
Gold, L.W., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.200-209, 8 refs.
Jones, S.J., Slade, T.D.
Ice cracks, Ice cover strength, Ice pressure, Ice loads, Ice deformation, Ice structure, Strain tests, Crack propagation.

46-4932
Proposed criterion for determining when the crushing with extrusion failure mode will occur in ice.
Marcellus, R.W., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.210-220, 45 refs.
Ice cracks, Ice cover strength, Ice breaking, Ice pressure, Ice loads, Ice deformation, Crack propagation, Ice solid interface, Offshore structures.

46-4933
Development of the ice-breaking cruise ship *Aurora*.
Kishi, S., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.221-231, 6 refs.
Narita, S.
Ice breaking, Ice navigation, Icebreakers, Ice loads, Ice solid interface, Metal ice friction.

46-4934
Ice force on a rectangular pile.
Takeuchi, T., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.232-242, 7 refs.
Saeki, H., Okamoto, S., Yamashita, T.
Ice loads, Ice solid interface, Ice breaking, Ice cover strength, Ice deformation, Ice pressure, Offshore structures.

46-4935
Numerical ice load model.
Comfort, G., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.243-257, 10 refs.
Selvadurai, A.P.S., Abdelnour, R., Au, M.C.
Ice loads, Ice solid interface, Ice pressure, Ice cover strength, Ice deformation, Ice breaking, Offshore structures, Ice models, Mathematical models.

46-4936
Flow properties of crushed ice: experimental observation and apparatus.
Spencer, P.A., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.258-268, 12 refs.
Masterson, D.M., Lucas, J., Jordaan, I.M.
Ice pressure, Ice solid interface, Ice deformation, Ice loads, Ice cover strength, Offshore structures, Viscous flow, Strain tests.

46-4937
Effect of the model ice density on the predicted performance of a structure or vessel in ice.
Abdelnour, R., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.269-282, 7 refs.
Comfort, G., Spencer, D.
Ice loads, Ice solid interface, Ice cover strength, Ice density, Metal ice friction, Offshore structures, Ships, Ice models, Mathematical models.

46-4938
Ensuring the safety of ice navigation of ships.
Tronin, V.A., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.283-295, 3 refs.
Malinovskiĭ, V.A., Lobanov, V.A., Poliakov, A.S.
Ice navigation, Ice loads, Ice solid interface, Metal ice friction, Ice conditions, Ice cover strength, Ice breaking, Ships, Safety, Mathematical models.

46-4939
Ice resistance tests on a segmented icebreaker model.
Liukkonen, S., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.296-308, 17 refs.
Nortala-Hoikkanen, A.
Icebreakers, Ice loads, Ice solid interface, Ice breaking, Ice navigation, Metal ice friction, Ice cover strength.

46-4940
Formation of ice dams and its fuzzy models.
Sun, Z.F., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.309-316, 3 refs.
Ice dams, Ice forecasting, Flood forecasting, River ice, Ice jams, Statistical analysis, Mathematical models.

46-4941
Breakup ice regime of Red Deer River at the city of Red Deer.
Gerard, R.L., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.317-328, 8 refs.
Long, D.J., Sawatsky, L.F., Winhold, T.
Ice breakup, Flood forecasting, Ice jams, River ice, Dams, Flood control, Canada—Alberta.

46-4942
Ice problems in Poland.
Majewski, W., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.329-334, 3 refs.
River ice, Ice control, Ice jams, Ice conditions, Reservoirs, Floods, Poland.

46-4943
Laboratory investigation of the flow in open channels with partial ice cover.
Majewski, W., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.335-345, 11 refs.
River ice, River flow, Ice cover effect, Ice water interface, Ice bottom surface, Channels (waterways), Mathematical models.

46-4944
Numerical analysis of tsunami by landslide in reservoir.
Murakami, Y., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.346-354, 1 ref.
Hohjo, K., Shimizu, Y.
Water waves, Landslides, Avalanches, Reservoirs, Mathematical models.

46-4945
Characteristics of shear stress in the ice-covered river.
Yamashita, S., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.355-360, 8 refs.
Shimizu, Y., Hohjo, K.
Icebound rivers, Ice water interface, Ice cover effect, River flow, River ice, Ice bottom surface, Mathematical models.

46-4946
Effects of a floating cover on backwater profiles.
Santeford, H.S., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.361-370, 7 refs.
Alger, G.R.
River ice, River flow, Ice water interface, Ice cover effect, Water level, Ice conditions.

46-4947
Spring breakup of the rivers in the Great Whale catchment area.
Parkinson, F.E., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.371-382.
Poulin, L.
Ice breakup, River ice, River flow, Ice conditions, Canada—Quebec.

46-4948
Ice jam thickness profiling on the Saint John River, New Brunswick.
Ismail, S., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.383-394, 13 refs.
Davis, J.L.
Ice jams, River ice, Ice surveys, Ice cover thickness, Radio echo soundings, Flood forecasting, Canada—New Brunswick.

46-4949
Ice cover effects on fluvial processes in the lower Yellow River.
Yang, X.Q., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.395-405, 19 refs.
Zhang, B.Z., Shen, H.T.
Icebound rivers, Ice water interface, Ice cover effect, River flow, River ice, Sediment transport, Alluvium, Water erosion, Mathematical models, China—Yellow River.

46-4950
Modeling of unsteady flow in upper Niagara River during ice-affected periods.
Crissman, R.D., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.406-417, 6 refs.
Chiu, C.L., Yu, W.Z., Corbu, I.
River flow, Ice cover effect, Flood forecasting, River ice, Ice water interface, Flow control, Mathematical models, Niagara River.

46-4951
Frazil jam evolution and cover load transport.
Shen, H.T., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.418-429, 28 refs.
Wang, D.S.
Frazil ice, Ice jams, Ice water interface, River ice, Ice cover effect, Ice bottom surface, River flow, Sediment transport, Mathematical models.

46-4952
Effect of ice jam on bed load movement at Hequ section of the Yellow River.
Ren, Z.W., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.430-436, 1 ref.
Ice jams, River flow, Ice water interface, Ice cover effect, River ice, Sediment transport, Water erosion, Mathematical models, China—Yellow River.

46-4953
Ice breakup and jamming in the Restigouche River, New Brunswick.
Beltaos, S., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.437-449, 13 refs.
Burrell, B.C.
Ice breakup, Ice jams, River flow, Flood forecasting, River ice, Ice water interface, Ice cover effect, Freezeup, Mathematical models, Canada—New Brunswick.

46-4954
Effect of freezing to the hydraulic properties of geotextiles.
Sun, Z.F., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.450-454.
Geotextiles, Frost resistance, Cold weather performance, Hydraulics, Permeability, Freeze thaw tests.

46-4955
River ice management during construction of the lower Nelson hydroelectric stations.
Korbaylo, B.W., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.455-466, 3 refs.
Carson, R.W.
River ice, Ice control, Ice jams, Electric power, River flow, Flow control, Canada—Manitoba—Nelson River.

46-4956
Further discussion about the ice drift problem in rubber dam.
Xu, S.B., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.467-476, 6 refs.
Gu, L.M.
River ice, Ice control, Dams, Ice jams, Hydraulic structures, Flood control.

46-4957
Successful mechanical removal of two major ice jams.
Doyle, P.F., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.477-488, 6 refs.
Ice jams, Ice removal, Floods, Flood control, River ice, Ice control, Canada—British Columbia.

46-4958
Dynamic analysis of ice floe underturning stability.
McGilvary, W.R., et al. MP 3117, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.489-502, 10 refs.
Coutermarsh, B.
River ice, River flow, Ice water interface, Ice cover effect, Ice floes, Ice cover strength, Ice bottom surface, Water pressure, Ice control, Ice models, Mathematical models.
In order to estimate the ice floe capture efficiency of a river ice cover, an underturning stability criteria is required for each characteristic floe geometry. In the current work, the measured hydrodynamic pressure distribution on the bottom of a single model ice floe is used to estimate the dynamic stability at three thickness to depth ratios. The energy-based analysis details the conditions required for instability, metastability, and stability. The results are shown to compare favorably to existing stability criteria. At all three thickness to depth ratios, the effect of block rotational inertia has the effect of reducing the Froude number by 5% to 10% over a completely static stability criterion.

46-4959
Severe winter ferry operation: the Mackenzie River at Ft. Providence, NWT.
Gerard, R.L., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.503-514, 4 refs.
Hicks, F., MacAlpine, T., Chen, X.
River ice, River crossings, Ice crossings, Freezeup, Ice breakup, Ice conditions, Cold weather operation, Ice navigation, Ice cover strength, Canada—Northwest Territories—Mackenzie River.

46-4960
Physical modeling of ice accumulation at hydraulic structures.
Ettema, R., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.515-526, 1 ref.
Crissman, R.D., Andres, D., Gerard, R.L.
Ice jams, River ice, River flow, Ice water interface, Water intakes, Hydraulic structures, Ice friction, Ice cover strength, Ice deformation, Ice models, Mathematical models.

46-4961
Plan for studying ice jamming on the upper Niagara River.
Crissman, R.D., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.527-538, 6 refs.
Ettema, R., Gerard, R.L., Andres, D.
Ice jams, River ice, Ice control, Electric power, Regional planning, Niagara River.

46-4962
Experimental study on thickness distribution of frazil ice jam in a curved flume.
Sun, Z.C., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.539-550.
Sui, J.Y., Yao, K.Z.
Frazil ice, Ice jams, River flow, Ice water interface, River ice, Ice cover effect, Ice cover thickness.

46-4963
Simulation of ice cover melting under the influence of air and water conditions.
Saadé, R.G., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.551-562, 7 refs.
Sarraf, S., Holder, G.
River ice, River flow, Ice melting, Air ice water interaction, Icebound rivers, Ice thermal properties, Ice cover thickness, Ice models, Mathematical models.

46-4964
Winter thermal regime of a nordic reservoir, the LG2 reservoir (James Bay).
Caron, O., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.563-574, 2 refs.
Dupuis, P., Pelletier, P.
Reservoirs, Ice water interface, Cold weather operation, Ice thermal properties, Thermal regime, Electric power, Ice conditions, Water temperature, Site surveys, Canada—Quebec.

46-4965
Numerical modeling of an ice cover leading edge.
Sarraf, S., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.575-584, 12 refs.
Zhang, X.T., El-Jabi, N.
River ice, Ice thermal properties, Ice water interface, Icebound rivers, Ice bottom surface, River flow, Ice heat flux, Ice edge, Ice melting, Mathematical models.

46-4966
GLACE91: a numerical ice generation and buildup model.
Saucet, J.P., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.1, 1992, p.585-594, 8 refs.
Beauchemin, P.
River ice, Ice formation, Ice growth, Ice water interface, River flow, Electric power, Ice models, Mathematical models.

46-4967
Heat transfer through ice-water interface with roughness.
Chu, V., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.595-606, 8 refs.
Wang, Y.H., Sarraf, S.
Ice water interface, Ice thermal properties, River ice, Ice heat flux, Ice bottom surface, Ice breakup, Ice jams, Surface roughness, Mathematical models.

46-4968
Uncomplicated model of ship icing.
Blackmore, R.Z., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.607-621, 17 refs.
Lozowski, E.P.
Ship icing, Ice forecasting, Sea spray, Ice accretion, Ice loads, Mathematical models.

46-4969
In-situ measurement of the permeability of frazil ice.
White, K.D., et al. MP 3118, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.622-632, 14 refs.
Lawson, D.E.
Frazil ice, River ice, Ice water interface, Permeability, Seepage, Bottom ice, Boreholes.
The intrinsic permeability of a frazil deposit can be used to describe its flow capacity and structure. Because of the nature of frazil ice, an in-situ test is desirable when determining this parameter in natural frazil deposits. This paper describes the application of a borehole dilution test to determine seepage velocity, which is then used to calculate intrinsic permeability and estimate porosity. Seepage velocities ranged from .00029 to .00598 cm/s (.00256 cm/s average), and average intrinsic permeability was .000275 sq cm. Porosities for d10 grain sizes of 0.5 and 3.5 mm were 82.9 and 47.9%, respectively. Seepage velocity and porosity data are also compared to data from laboratory borehole dilution tests, previous in-situ groundwater flow meter measurements at the same site, and permeameter tests on remolded samples.

46-4970
Effect of the snow cover on ice growth rates at landfast ice stations in the Canadian Arctic.
Prinsenberg, S.J., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.633-644, 8 refs.
Snow ice interface, Ice growth, Ice thermal properties, Air ice water interaction, Sea ice, Ice heat flux, Snow cover effect, Degree days, Fast ice, Mathematical models.

46-4971
Influence of power production on water temperature.
Asvall, R.P., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.645-655.
Reservoirs, Water temperature, Thermal pollution, Cold weather operation, Electric power, Environmental protection, Norway.

46-4972
Ice regime of Rupert Bay.
Michel, B., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.656-670, 6 refs.
Quach, T.T., Desroches, P.
Ice growth, Ice formation, Ice conditions, Air ice water interaction, Ice surveys, Electric power, Canada, Quebec.

46-4973
Frazil ice formation and adhesion on trash racks.
Andersson, A., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.671-682, 19 refs.
Andersson, L.O.
Frazil ice, Ice formation, Ice adhesion, Electric power, Water intakes, Ice accretion, Ice loads.

46-4974
Initiation and growth of ice cover in Lake Ogawara.
Hirayama, K., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.683-694, 11 refs.
Lake ice, Ice formation, Ice growth, Ice cover thickness, Ice cover strength, Ice forecasting.

46-4975
Potential effects of climate change on ice in the Beaufort Sea.
Pilkington, R., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.695-709, 19 refs.
Hill, C., McGillivray, D., Agnew, T.
Ice growth, Air ice water interaction, Ice cover thickness, Sea ice distribution, Global warming, Polar atmospheres, Beaufort Sea.

46-4976
Observation and numerical simulation of thermal and ice regimes in the Jing-Mi Canal.
Li, G.F., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.710-722, 4 refs.
Lu, S.N., Yang, X.Q., Huokuna, M.
Channels (waterways), Water supply, Ice conditions, Cold weather operation, River ice, Ice cover effect, Thermal regime, China, Beijing.

46-4977
Growth rates of frazil ice discs.
Forest, T.W., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.723-734, 7 refs.
Sharma, R.
Frazil ice, Ice growth, River ice, Ice water interface, Ice forecasting, Mathematical models.

46-4978
Heat exchange at the air exposed surface of icebergs.
Löset, S., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.735-746, 11 refs.
Icebergs, Ice air interface, Ice heat flux, Ice sublimation, Ice thermal properties, Ablation, Ice melting, Ice surface, Mathematical models.

46-4979
Development of the original ice borehole jack.
Masterson, D.M., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.748-759, 12 refs.
Graham, W.
Ice cover strength, Ice pressure, Borehole instruments, Ice loads, Strain measuring instruments.

46-4980
Transport Canada pressuremeter.
Michel, B., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.760-772, 5 refs.
Hodgson, T.P.
Ice cover strength, Ice pressure, Borehole instruments, Ice loads, Strain measuring instruments.

46-4981
Borehole penetration and expansion devices for ice testing.
Ladanyi, B., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.773-786, 25 refs.
Ice cover strength, Ice pressure, Borehole instruments, Ice loads, Penetration tests, Mathematical models.

46-4982
Application of the borehole jack indentor in river ice break-up research.
Prowse, T.D., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.787-801, 28 refs.
Demuth, M.N.
Ice cover strength, River ice, Borehole instruments, Ice breakup, Flood forecasting, Ice jams, Mathematical models.

46-4983
Interpretation of in situ borehole ice strength measurement tests.
Masterson, D.M., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.802-815, 10 refs.
Ice cover strength, Ice pressure, Borehole instruments, Ice loads, Strain tests, Mathematical models.

46-4984
NRCC ice borehole indentation and uniaxial tests—a critical assessment.
Sinha, N.K., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.816-827, 19 refs.
Ice cover strength, Ice deformation, Borehole instruments, Ice pressure, Ice loads, Strain tests.

46-4985
Estimating the effective strain modulus of deteriorating freshwater ice using the borehole jack indentor.
Demuth, M.N., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.828-840, 19 refs.
Prowse, T.D.
Ice cover strength, Ice pressure, Borehole instruments, Ice loads, Ice deformation, Ice breakup, River ice, Strain tests.

46-4986
In-situ borehole testing in ice: a historical perspective.
Kivisild, H.R., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.841-855, 12 refs.
Ice cover strength, Ice pressure, Borehole instruments, Ice loads, Ice deformation, Strain tests.

46-4987
Interpretation of field measurements for ice engineering applications.
Gold, L.W., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.856-869, 22 refs.
Ice cover strength, Ice pressure, Ice deformation, Borehole instruments, Ice loads, Strain tests.

46-4988
Probabilistic behaviour of a Poisson field of flaws in ice subjected to indentation.
Maes, M.A., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings Vol.2, 1992, p.871-882, 15 refs.
Ice cracks, Ice deformation, Ice cover strength, Ice pressure, Ice loads, Ice breaking, Crack propagation, Ice solid interface, Statistical analysis, Mathematical models.

46-4989
Probabilistic method for determining ice loads on structures.
Wang, A.T., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.883-896, 18 refs.
Poplin, J.P.
Ice solid interface, Ice loads, Ice pressure, Offshore structures, Computerized simulation, Statistical analysis.

46-4990
Materials properties based risk analysis for qualitative prediction of ice failure.
Parsons, B.L., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings Vol.2, 1992, p.897-908, 37 refs.
Ice cracks, Ice deformation, Ice cover strength, Ice loads, Ice creep, Crack propagation, Ice solid interface, Statistical analysis.

46-4991
Ice-structure interaction with segmented indentors.
Sodhi, D.S., MP 3119, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.909-929, 46 refs.
Ice solid interface, Ice loads, Ice pressure, Ice deformation, Ice cover strength, Impact tests, Penetration tests, Mathematical models.
Experimental work on ice-structure interaction is reviewed. The review includes small-scale and medium-scale indentation tests conducted to understand this interaction and to measure the effective pressures at different speeds and contact areas. Different modes of ice failure have been identified, such as ductile failure, ductile flaking and brittle flaking. Experiments to understand brittle flaking were conducted in the laboratory to observe the ice-structure interaction and to measure pressure in different parts of the indentor. It was found that the contact between the indentor and the ice failing during brittle flaking is over a small area of contact. Such small areas of contact were also observed in the ship-ice interaction. To compare results of indentation tests done at different scales, it is suggested that a similarity principle from "replica" modeling be adopted. In replica modeling, the indentation tests are done at a scale smaller than full-scale, using the same material and the same indentation speed as in full scale. Using this similarity principle, the effective pressure measured in small-scale indentation tests in freshwater ice is found to be in the range of pressures measured on large structures in the field.

46-4992
Medium scale iceberg impact test program.
Masterson, D.M., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.930-966, 17 refs.
Icebergs, Ice solid interface, Ice loads, Ice pressure, Impact tests, Ice strength, Drift, Offshore structures.

46-4993
Dynamically forced floating beam.
Zhao, Z.G., et al. IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.967-978, 8 refs.
Dempsey, J.P.
Ice loads, Ice deformation, Ice cover strength, Ice water interface, Ice bottom surface, Hydrodynamics, Mathematical models.

46-4994
Observations of stress in arctic pack ice.
Perovich, D.K., et al. MP 3120, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.979-990, 20 refs.
Jones, K.F., Tucker, W.B.
Pack ice, Ice loads, Ice deformation, Ice cover strength, Ice pressure, Thermal stresses, Strain measuring instruments, Mathematical models.
Measurements of ice stresses were made from Sep. through Nov. in first-year and multiyear sea ice in the Eastern Arctic ice pack. Observed stresses were typically less than 50 kPa, with peak values reaching 400 kPa in young ice and 150 kPa in the interior of a multiyear floe. The largest stresses were always observed in the upper half of the ice sheet. Three sources of ice stress were identified in the multiyear record: 1) stresses induced by temperature changes, 2) stresses resulting from inertial oscillations of the ice pack, and 3) stresses occurring during deformation events. Stresses in the first year ice were caused by inertial motions and by deformation. Under certain loading conditions, strong coupling was evident between the thin first-year ice and the adjacent multiyear floes, with stresses being greatest in the young ice and rapidly attenuating away from the floe edge in the multiyear ice. The stress field in the ice pack was complex and showed great spatial and temporal variability.

A two-dimensional finite element model (ABAQUS) was used to interpret the point stress measurements and to estimate the stress distribution in the ice associated with unidirectional loading.

46-4995
Large-scale fracture of sea ice plates.
Bažant, Z.P., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.991-1005, 38 refs.
Ice cracks, Ice deformation, Ice cover strength, Ice elasticity, Ice loads, Ice creep, Crack propagation, Fracturing, Brittleness, Thermal stresses, Mathematical models.

46-4996
Fracture process zone due to transient creep in polycrystalline ice.
Shyam Sunder, S., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1006-1020, 20 refs.
Nanthikesan, S.
Ice cracks, Ice deformation, Ice creep, Ice cover strength, Ice loads, Ice elasticity, Crack propagation, Mathematical models.

46-4997
Preliminary investigation of the ductile-brittle transition in columnar S2 ice under compression.
Batto, R.A., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1021-1034, 12 refs.
Schulson, E.M.
Ice deformation, Ice cracks, Ice pressure, Ice cover strength, Ice loads, Brittleness.

46-4998
Evaluation of micromechanical processes in deformation of sea ice single crystals.
Brown, R.L., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1035-1046, 15 refs.
McKittrick, L.R.
Ice deformation, Ice microstructure, Ice strength, Ice crystals, Sea ice, Dislocations (materials), Brines, Mathematical models.

46-4999
Brittle compressive failure of columnar ice under biaxial loading.
Schulson, E.M., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1047-1064, 33 refs.
Smith, T.R.
Ice deformation, Ice pressure, Ice cover strength, Ice loads, Ice cracks, Brittleness, Strain tests, Mathematical models.

46-5000
Compressive strength of frazil sea ice.
Richter-Menge, J.A., MP 3121, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1065-1074, 12 refs.
Frazil ice, Ice cover strength, Ice pressure, Ice loads, Sea ice, Ice deformation, Compressive properties, Brines, Strain tests, Antarctica--Weddell Sea.
Unconfined, uniaxial compressive strength tests were performed on frazil sea ice samples collected in the Weddell Sea. The tests were done at constant strain rates ranging from .01 to .00001 s and temperatures of -5 and -10 C. These conditions covered the brittle-to-ductile transition of this ice type. Results of the tests are presented and the compressive strength of the frazil samples is compared to the strength of transversely isotropic columnar saline ice loaded perpendicular to the growth direction. This analysis indicates that the strength of the frazil and columnar ice is comparable at a given porosity. The author discusses this finding with respect to the variations in the structural characteristics of each ice type. In particular, the influence of grain size and the spacing of brine inclusions are considered. (Auth.)

46-5001
Crack nucleation in columnar ice.
Frost, H.J., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1075-1086, 30 refs.
Smith, T.R.
Ice cracks, Ice deformation, Ice loads, Ice pressure, Ice cover strength, Crack propagation, Dislocations (materials), Ice microstructure, Stress concentration, Mathematical models.

46-5002
Ice physics and micromechanics: a review of selected topics.
Cole, D.M., MP 3122, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1087-1099, 59 refs.
Ice deformation, Ice pressure, Ice creep, Ice cracks, Ice loads, Ice strength, Ice microstructure, Dislocations (materials), Internal friction.
This paper focuses on recent theoretical and experimental developments in laboratory studies of ice physics and micromechanics. Topics of interest include progress in the observation and interpretation of dislocation-based processes and their relationship to mechanical behavior, electrical effects, microcrack nucleation, anelasticity, internal friction, creep and pressure effects. Recent experimental developments are discussed and their impact on current theories are evaluated. Relevant contributions include crack nucleation studies, techniques for reversed direct-stress testing, fatigue crack growth studies and the direct observation of dislocations. Research findings are assessed in terms of the insight they provide regarding the physical processes that underlie mechanical behavior. Areas where recent findings are at odds with established lines of thought receive particular attention.

46-5003
Dislocation motion and plasticity of ice.
Wei, Y.C., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1100-1114, 26 refs.
Dempsey, J.P.
Ice deformation, Ice plasticity, Ice crystal structure, Ice creep, Ice cracks, Ice microstructure, Dislocations (materials).

46-5004
Synchrotron x-ray topography of polycrystalline ice.
Liu, F.P., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1115-1126, 13 refs.
Baker, I., Dudley, M., Yao, G.D.
Ice crystal structure, Ice deformation, Ice microstructure, Dislocations (materials), X ray analysis.

46-5005
Application of scanning electron microscopy in the fracture and fatigue of granular polycrystalline ice.
Weber, L.J., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1127-1139, 26 refs.
Nixon, W.A.
Ice crystal structure, Ice deformation, Ice cracks, Ice microstructure, Ice strength, Dislocations (materials), Fatigue (materials), Ice crystal replicas, Scanning electron microscopy.

46-5006
Applications of electrical signals from cracks in ice micromechanics.
Petrenko, V.F., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1140-1154, 15 refs.
Ice deformation, Ice cracks, Ice microstructure, Ice electrical properties, Ice elasticity, Ice cover strength, Crack propagation, Mathematical models.

46-5007
Fracturing and crack growth velocity of brackish sea ice.
Stehn, L., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1155-1166, 18 refs.
Salt ice, Ice deformation, Ice cracks, Ice cover strength, Sea ice, Ice solid interface, Ice loads, Ice creep, Crack propagation, Mathematical models.

46-5008
Development of cracks in S2 freshwater ice under constant strain rate loading.
Nixon, W.A., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1167-1175, 10 refs.
Wasif, M.A.
Ice deformation, Ice cracks, Ice cover strength, Ice loads, Ice pressure, Strain tests.

46-5009
Sea ice leads and characteristics.
Pritchard, R.S., IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1176-1187, 14 refs.
Ice openings, Ice deformation, Ice cover strength, Ice cracks, Ice plasticity, Sea ice, Ice models, Mathematical models.

46-5010
Pack ice anisotropic constitutive model.
Coon, M.C., et al, IAHR Symposium on Ice, 11th, Banff, Alberta, Canada, June 15-19, 1992. Proceedings. Vol.2, 1992, p.1188-1205, 19 refs.
Echert, D.C., Knoke, G.S.
Pack ice, Ice openings, Ice deformation, Ice cover strength, Ice loads, Ice pressure, Ice cracks, Anisotropy, Ice models, Mathematical models.

46-5011
Proceedings.
NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. *NATO Advanced Science Institutes Series G*, 1990, Vol.28, 471p., Refs. passim. For individual papers see 46-5012 through 46-5026.
Davies, T.D., ed, Tranter, M., ed, Jones, H.G., ed
DLC GB2601.2.N36 1990
Snow cover stability, Snow physics, Seasonal variations, Chemical composition, Snow composition, Climatic factors, Snow hydrology, Snow impurities, Snow air interface, Atmospheric composition, Snowmelt.

46-5012
Snow formation and processes in the atmosphere that influence its chemical composition.
Barrie, L.A., *NATO Advanced Science Institutes Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks--processes of compositional change. Edited by T.D. Davies et al, p.1-20, 57 refs.
DLC GB2601.2.N36 1990
Snowfall, Meteorological factors, Cloud physics, Snow crystal growth, Heterogeneous nucleation, Snow composition, Chemical composition, Scavenging, Snow air interface, Aerosols, Air temperature.

46-5013
Dry deposition to snow packs.
Cadle, S.H., et al, *NATO Advanced Science Institutes Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks--processes of compositional change. Edited by T.D. Davies et al, p.21-70. Includes discussion. Refs. passim.
Conklin, M.H.
DLC GB2601.2.N36 1990
Snow cover, Sedimentation, Snow composition, Aerosols, Snow air interface, Vapor transfer, Chemical composition, Mass transfer, Particles, Ozone, Sampling.

46-5014
Impact of blowing snow on snow chemistry.
Pomeroy, J.W., et al, *NATO Advanced Science Institutes Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks--processes of compositional change. Edited by T.D. Davies et al, p.71-113, 53 refs.
Davies, T.D., Tranter, M.
DLC GB2601.2.N36 1990
Snow composition, Mass transfer, Blowing snow, Chemical composition, Snow erosion, Snow impurities, Wind factors, Sublimation, Ion density (concentration), Scavenging, Snow cover stability.

46-5015
Links between snowpack physics and snowpack chemistry.
Davis, R.E., *NATO Advanced Science Institutes Series G*, 1990, Vol.28, MP 3123, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks--processes of compositional change. Edited by T.D. Davies et al, p.115-138, 60 refs.
DLC GB2601.2.N36 1990
Snow cover stability, Metamorphism (snow), Snow physics, Snowmelt, Chemical composition, Water flow, Snow hydrology, Leaching, Ice water interface, Solutions.
This paper includes two major parts. Theories and observations of dry and wet snow metamorphism are surveyed with discussions on the location and migration of chemical species, followed by a review of observations of heterogeneous water flow and some attempts to model percolation in two modes. Next, the theory of water flow coupled to solute transport is presented for homogeneous flow in a homogeneous snow layer. A method accounting for water flow in multiple paths is described, summarizing the difficulties of coupling solute flow. Both the discussion of metamorphism and water flow in snow conclude with comments on the disparity between theory and measurements, especially as it relates to the effects of stratigraphy of snow covers. The review does not cite all of the work in this field, but summarizes what this author considers to be the important concepts and gaps in understanding the links between snow pack physics and chemistry.

46-5016
Modeling in-pack chemical transformations.
Bales, R.C., *NATO Advanced Science Institutes. Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks processes of compositional change. Edited by T.D. Davies et al, p.139-163, Refs. p.159-163.
DLC GB2601.2.N36 1990
Snow cover, Snow composition, Chemical composition, Snowmelt, Ion diffusion, Snow hydrology, Ice air interface, Chemical analysis, Mathematical models, Hydrogeochemistry.

46-5017
Chemical change in snowpacks.
Brimblecombe, P., et al, *NATO Advanced Science Institutes. Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks– processes of compositional change. Edited by T.D. Davies et al, p.165-171, 11 refs.
Shooter, D.
DLC GB2601.2.N36 1990
Snow cover, Snow composition, Chemical composition, Snowmelt, Ion diffusion, Solutions, Temperature effects, Liquid phases, Chemical properties.

46-5018
Snow chemistry and biological activity: a particular perspective on nutrient cycling.
Jones, H.G., et al, *NATO Advanced Science Institutes. Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks--processes of compositional change. Edited by T.D. Davies et al, p.173-239, Includes discussion. Refs. passim.
Barry, P.J., Hoham, R.W.
DLC GB2601.2.N36 1990
Snow cover, Snow composition, Chemical composition, Ecology, Nutrient cycle, Biomass, Environmental impact, Forest ecosystems.

46-5019
Controls on the composition of snowmelt.
Tranter, M., *NATO Advanced Science Institutes. Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks—processes of compositional change. Edited by T.D. Davies et al, p.241-271, Refs. p.266-271.
DLC GB2601.2.N36 1990
Snowmelt, Chemical composition, Snow impurities, Solutions, Ion diffusion, Leaching, Ice water interface, Environmental factors, Snow hydrology, Water flow.

46-5020
Chemical composition and fluxes of wet deposition at elevated sites (700-3105 m a.s.l.) in the Eastern Alps (Austria).
Puxbaum, H., et al, *NATO Advanced Science Institutes. Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks—processes of compositional change. Edited by T.D. Davies et al, p.273-301, Includes discussion. 35 refs.
DLC GB2601.2.N36 1990
Snow cover, Snow composition, Chemical composition, Seasonal variations, Air pollution, Snow impurities, Ion density (concentration), Alpine landscapes, Sampling.

46-5021
Influence of urban areas on the chemistry of regional snow cover.
Suzuki, K., et al, *NATO Advanced Science Institutes. Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks - processes of compositional change. Edited by T.D. Davies et al, p.303-322, Includes discussion. 17 refs.
Davies, T.D.
DLC GB2601.2.N36 1990
Snow cover distribution, Snow composition, Chemical composition, Snow impurities, Air pollution, Topographic effects, Ion density (concentration), Scavenging.

46-5022
Organic micropollutants in seasonal snowcover and firn.
Gregor, D.J., *NATO Advanced Science Institutes. Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks processes of compositional change. Edited by T.D. Davies et al, p.323-358, Refs. p.354-358.
DLC GB2601.2.N36 1990
Snow cover, Firn, Snow composition, Chemical composition, Snow impurities, Air pollution, Hydrocarbons, Snow air interface, Chemical properties, Environmental impact.

46-5023
Chemistry of snow from high altitude, mid/low latitude glaciers.
Lyons, W.B., et al, *NATO Advanced Science Institutes. Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks--processes of compositional change. Edited by T.D. Davies et al, p.359-383, Refs. p.379-383.
Wake, C., Mayewski, P.A.
DLC GB2601.2.N36 1990
Snow composition, Chemical composition, Glacier ice, Ice cores, Seasonal variations, Sampling, Ion density (concentration), Atmospheric composition.

46-5024
Use of snow and firn analysis to reconstruct past atmospheric composition.
Neftel, A., et al, *NATO Advanced Science Institutes. Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks--processes of compositional change. Edited by T.D. Davies et al, p.385-419, Includes discussion. Refs. passim.
Wolff, E.W.
DLC GB2601.2.N36 1990
Snow composition, Atmospheric composition, Firn, Glacier ice, Ice cores, Air pollution, Chemical composition, Impurities, Ion density (concentration), Drill core analysis, Paleoclimatology.

46-5025
Climatic change and seasonal snowcovers: a review of the factors regulating the chemical evolution of snowcover and a predictive case for north-eastern North America.
Davies, T.D., et al, *NATO Advanced Science Institutes. Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks--processes of compositional change. Edited by T.D. Davies et al, p.421-456, Refs. p.451-456.
Vavrus, S.J.
DLC GB2601.2.N36 1990
Snow cover distribution, Snow composition, Chemical composition, Climatic changes, Seasonal variations, Snowmelt, Environmental impact, Forecasting, Global warming.

46-5026
Chemical processes in snow—where should we go.
Dozier, J., et al, *NATO Advanced Science Institutes. Series G*, 1990, Vol.28, NATO Advanced Research Workshop on Processes of Chemical Change in Snowpacks, Maratea, Italy, July 23-27, 1990. Proceedings. Seasonal snowpacks—processes of compositional change. Edited by T.D. Davies et al, p.457-460.
Gjessing, Y.T., Johannes, A.J., Morris, E.M.
DLC GB2601.2.N36 1990
Snow cover, Snow composition, Chemical composition, Chemical analysis, Snow air interface, Meteorological factors.

46-5027
Resource-saving technologies for the underground mining of mineral deposits in the North; collected scientific papers. [Resursosberegaiushchie tekhnologii pri podzemnoĭ otrabotke poleznykh iskopaemykh Severa; sbornik nauchnykh trudov],
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Thermal regime, Mining, Mine shafts.

46-5058
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Quarries, Excavation.

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Atmospheric circulation, Cloud cover, Cloud physics, Nucleation, Ice crystal growth, Phase transformations, Humidity, Unfrozen water content, Radiation balance, Albedo, Weather forecasting, Precipitation (meteorology), Mathematical models.

46-5128
Lead detection and mapping with reference to relationships between scale, sensor characteristics, surface conditions and atmospheric properties. Annual report, Apr. 15, 1990-Apr. 14, 1991.
Key, J., et al, Boulder, University of Colorado, Cooperative Institute for Research in Environmental Sciences, 1991, 54p. + appends., ADA-235 121, 14 refs.
Maslanik, J.A., Stone, R.S., McLaren, A.S.
Ice openings, Ice surveys, Sea ice distribution, Underwater acoustics, Subglacial observations, Spaceborne photography, Atmospheric attenuation, Detection, Mathematical models.

46-5129
Portable hydraulic power source.
Sinclair, N., *U.S. Naval Civil Engineering Laboratory. Technical report*, Mar. 1991, NCEL-TR-934, 20p. + appends., ADA-235 557, 7 refs.
Diesel engines, Pumps, Portable equipment, Electric power, Hydraulic structures, Cold weather performance.

46-5130
Environmental measurements in the Beaufort Sea, spring 1990.
Wen, T., et al, *University of Washington, Seattle. Applied Physics Laboratory. Technical report*, Dec. 1990, APL-UW TR9105, 38p. + appends., ADA-237 592, 15 refs.
Underwater acoustics, Ice acoustics, Drift, Oceanographic surveys, Ocean environments, Subglacial observations, Ice islands, Ice floes, Beaufort Sea.

46-5131
Satellite altimetry for naval oceanography.
Johnson, D.R., *U.S. Naval Oceanographic and Atmospheric Research Laboratory. Technical note*, Nov. 1990, NOARL-TN-87, 37p. + appends., ADA-231 081, 19 refs.
Ice surveys, Ice reporting, Sea ice distribution, Spaceborne photography, Remote sensing, Oceanographic surveys, Height finding, Sea level.

46-5132
Impact of icing on unmanned aerial vehicle (UAV) operations.
Siquig, R.A., *U.S. Naval Oceanographic and Atmospheric Research Laboratory. NOARL contribution*, 1990, PR 90:015:442, p.13-19, ADA-231 191, 3 refs.
Aircraft icing, Ice forecasting, Ice detection, Ice loads, Supercooled clouds.

46-5133
Large ice crystal charge transfer studies.
Saunders, C.P.R., *European Office of Aerospace Research and Development. Technical report*, 1991, EOARD-TR-91-07, 89p., ADA-238 971, Refs. p.82-89.
Ice electrical properties, Cloud electrification, Thunderstorms, Charge transfer, Ice crystal collision, Ice crystal size, Snow pellets, Scavenging, Mathematical models.

46-5134
Icing characteristics of a natural-laminar-flow, a medium-speed, and a swept, medium-speed airfoil.
Bidwell, C.S., *U.S. National Aeronautics and Space Administration. Technical memorandum*, 1991, NASA-TM-103693, 30p., N91-19046, 9 refs. Prepared for the 29th Aerospace Sciences Meeting of the American Institute of Aeronautics and Astronautics, Reno, NV, Jan. 7-10, 1991.
Aircraft icing, Ice accretion, Ice loads, Air flow, Wind tunnels.

46-5135
Prediction of ice shapes and their effect on airfoil performance.
Shin, J.W., et al, *U.S. National Aeronautics and Space Administration. Technical memorandum*, 1991, NASA-TM-103701, 21p., N91-19047, 9 refs. Prepared for the 29th Aerospace Sciences Meeting of the American Institute of Aeronautics and Astronautics, Reno, NV, Jan. 7-10, 1991.
Berkowitz, B., Chen, H., Cebeci, T.
Aircraft icing, Ice accretion, Ice loads, Ice forecasting, Air flow, Ice solid interface, Wind tunnels, Mathematical models.

46-5136
Ongoing development of a computer jobstream to predict helicopter main rotor performance in icing conditions.
Britton, R.K., *U.S. National Aeronautics and Space Administration. Contractor report*, Feb. 1991, NASA-CR-187076, 14p., N91-19056, 19 refs.
Aircraft icing, Helicopters, Ice accretion, Ice forecasting, Ice loads, Computerized simulation, Mathematical models.

46-5137
Automatic control study of the icing research tunnel refrigeration system.
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Soeder, R.H.
Aircraft icing, Ice accretion, Wind tunnels, Refrigeration, Temperature control, Computerized simulation, Mathematical models.

46-5138
Simulation of iced wing aerodynamics.
Potapczuk, M.G., et al, *U.S. National Aeronautics and Space Administration. Technical memorandum*, 1991, NASA-TM-104362, 15p., N91-23086, 17 refs.
Bragg, M.B., Kwon, O.J., Sankar, L.N.
Aircraft icing, Ice accretion, Air flow, Ice loads, Computerized simulation, Mathematical models.

46-5139
Icing simulation: a survey of computer models and experimental facilities.
Potapczuk, M.G., et al, *U.S. National Aeronautics and Space Administration. Technical memorandum*, 1991, NASA-TM-104366, 27p., N91-23087, 81 refs.
Reinmann, J.J.
Aircraft icing, Ice accretion, Ice prevention, Ice removal, Air flow, Ice loads, Computerized simulation.

46-5140
Advanced ice protection systems test in the NASA Lewis Icing Research Tunnel.
Bond, T.H., et al, *U.S. National Aeronautics and Space Administration. Technical memorandum*, 1991, NASA-TM-103757, 10p., N91-23183, 4 refs. Prepared for the 47th annual forum and technology display of the American Helicopter Society, Phoenix, AZ, May 6-8, 1991.
Shin, J.W., Mesander, G.A.
Aircraft icing, Ice prevention, Ice accretion, Ice removal, Wind tunnels.

46-5141
Model rotor icing tests in the NASA Lewis Icing Research Tunnel.
Flemming, R.J., et al, *U.S. National Aeronautics and Space Administration. Technical memorandum*, 1991, NASA-TM-104351, 25p., N91-23184, 14 refs.
Britton, R.K., Bond, T.H.
Aircraft icing, Helicopters, Ice accretion, Ice loads, Wind tunnels.

46-5142
Applied high-speed imaging for the icing research program at NASA Lewis Research Center.
Slater, H., et al, *U.S. National Aeronautics and Space Administration. Technical memorandum*, 1991, NASA-TM-104415, 16p., N91-26490, 4 refs. Prepared for the International Symposium on Optical Applied Science and Engineering of the Society of Photo-Optical Instrumentation Engineers, San Diego, CA, July 21-26, 1991.
Owens, J., Shin, J.W.
Aircraft icing, Ice accretion, Photographic techniques, Ice detection, Wind tunnels.

46-5143
Calculated performance of the NASA Lewis Icing Research Tunnel.
Viterna, L.A., *U.S. National Aeronautics and Space Administration. Technical memorandum*, Aug. 1991, NASA-TM-105173, 20p., N91-29199, 3 refs.
Aircraft icing, Ice accretion, Wind tunnels, Air flow.

46-5144
Snow/rain collector sampler.
Purcell, R.G., et al, *U.S. Environmental Protection Agency. Atmospheric Research and Exposure Assessment Laboratory. Report,* Mar. 1991, EPA/600/3-91/005, 40p. PB91-167601.
Brown, R.B.
Snow samplers, Precipitation gages, Meteorological instruments, Snow impurities, Computer programs, Data processing.

46-5145
Research on new ultrasonic implementation for aviation. Phase 1. Final report.
Tehon, S.W., *U.S. National Science Foundation. Report,* July 1988, NSF/ISI-88057, 38p. + appends., PB91-168161, 63 refs.
Aircraft icing, Ice detection, Ultrasonic tests, Ice accretion, Mathematical models.

46-5146
Sub-bottom surveying in lakes with ground-penetrating radar.
Sellmann, P.V., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* May 1992, CR 92-08, 18p., ADA-252 860, 17 refs.
Delaney, A.J., Arcone, S.A.
Antennas, Radar, Underwater acoustics, Lakes, Sounding.
Short-pulse radar was used on lakes in New Hampshire for sub-bottom surveying. The objectives were to construct a low-frequency, high-powered antenna suited for this application, and to evaluate the technique under a range of sub-bottom conditions. A compact 50-MHz antenna with a hydrodynamic housing was fabricated for this study. The transmitter provided a peak input power of approximately 1000 W and noise was decreased by submerging the separated antennas on each side of a fiberglass boat to assure consistent coupling. A 100-MHz commercial antenna unit placed in the bottom of the boat and a 7-kHz acoustic sounder, both of which had vertical resolution theoretically comparable or superior to that of the 50-MHz radar, and theoretical studies of antenna directivity were used to help evaluate the results. In shallow water of 1-2 m depth, estimates of the thickness of low density organic sediments (1-4 m thick) over more dense bed material were obtained at both radar frequencies. Noticeable apparent sedimentary bedding and layering, various sediment types and variations in the depth to bedrock beneath the bed were obtained in low-conductivity lake water more than 20 m deep with the higher powered 50-MHz system. Maximum bed penetration was at least 7 m in these cases, and vertical bedding resolution was far superior to the acoustic results. Radar bathymetry and limited sub-bottom data were obtained in water up to 30 m deep.

46-5147
Performance of insulated pavements at Newton Field, Jackman, Maine.
Kestler, M.A., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* May 1992, CR 92-09, 24p., ADA-254 017, 10 refs.
Berg, R.L.
Frost penetration, Insulation, Frost heave, Concrete pavements, Cold weather performance.
In 1986 the runway at Newton Field, a small airport in Jackman, ME, was reconstructed using a 2 in.-thick layer of extruded polystyrene insulation as part of the pavement structure. At the same time, a nearby town road was reconstructed using a conventional noninsulated pavement cross section for relatively heavy loads. Both pavements were monitored for frost penetration, frost heave, and seasonal changes in pavement strength. Since frost penetration beneath the insulation layer of the runway at Newton Field exceeded empirical estimates during winter 1986-1987, four additional test sections with varying combinations of insulation and subbase thicknesses were constructed adjacent to the airport's parking apron during summer 1987. Although the thermal performance of the insulated pavement test sections was comparable to design expectations for the following 3 years, evidence of discontinuities in the insulation layer in the Newton Field runway demonstrates the insulated pavement's susceptibility to variations in construction technique and site conditions. This report discusses pavement performance at each of the test sites over the observation periods 1986-1990 and 1987-1990.

46-5148
Aqueous extraction—headspace/gas chromatographic method for determination of volatile organic compounds in soils.
Hewitt, A.D., et al, *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Apr. 1992, CR 92-06, 14p., ADA-253 124, 27 refs.
Miyares, P.H., Leggett, D.C., Jenkins, T.F.
Soil pollution, Environmental impact.
This study compares aqueous extraction-headspace/Gas Chromatography (GC) and the EPA SW-846 purge-and-trap-gas chromatography/mass spectrometry (Method 8240) for the determination of four common Volatile Organic Compounds (VOCs) in soils. Comparisons were made on two fortified soils and two contaminated field soils. In only two of the cases were consistent significant differences found—for the two most hydrophobic compounds in a high organic carbon soil, and for TCE in a field-contaminated soil that had previously shown slow aqueous VOC desorption. The findings strongly suggest that aqueous extraction-headspace/GC can be used not only to screen soils for VOCs giving same-day results, but often will provide results not significantly different from current laboratory based measurements.

46-5149
Modelling frost heaving and frost penetration in soils at some observation sites in Finland. The SSR model.
Saarelainen, S., *Finland. Technical Research Centre (Valtion teknillinen tutkimuskeskus). VTT publications,* 1992, No.95, 119p. + append., Ph.D. thesis to be presented at Tampere University of Technology. 56 refs.
Soil freezing, Frost heave, Frost penetration, Frozen ground thermodynamics, Soil strength, Frost forecasting, Frost resistance, Active layer, Computer programs, Mathematical models, Finland.

46-5150
Asphalt mixtures modified with tall oil pitches and cellulose fibres.
Peltonen, P., *Finland. Technical Research Centre (Valtion teknillinen tutkimuskeskus). VTT publications,* 1992, No.99, 83p., Ph.D. thesis to be presented at the University of Helsinki. 78 refs.
Bituminous concretes, Concrete admixtures, Concrete pavements, Frost protection, Frost resistance, Cold weather performance, Concrete durability, Resins.

46-5151
Characterization, classification, and utilization of cold Aridisols and Vertisols.
International Soil Correlation Meeting, 6th, Aug. 6-18, 1989, Washington, D.C., U.S. Soil Conservation Service, 1991, 253p., PB91-220483, Refs. passim.
For selected papers see 46-5152 through 46-5161.
Kimble, J.M., ed.
Cryogenic soils, Desert soils, Soil surveys, Soil classification, Clay soils, Saline soils, Soil water, Soil temperature, Soil chemistry, Soil formation, Soil conservation.

46-5152
Physical properties affecting the productivity and management of clay soils in Saskatchewan.
De Jong, E., et al, International Soil Correlation Meeting, 6th, Aug. 6-18, 1989. Proceedings. Edited by J.M. Kimble. Characterization, classification, and utilization of cold Aridisols and Vertisols, Washington, D.C., U.S. Soil Conservation Service, 1991, p.29-38, PB91-220483, 40 refs.
Elliott, J.A.
Clay soils, Soil water, Snowmelt, Seepage, Snow cover effect, Soil temperature, Soil texture, Soil erosion, Agriculture, Soil conservation, Canada—Saskatchewan.

46-5153
Soil forming processes in soils with cryic and frigid soil temperature regimes in Idaho.
Fosberg, M.A., et al, International Soil Correlation Meeting, 6th, Aug. 6-18, 1989. Proceedings. Edited by J.M. Kimble. Characterization, classification, and utilization of cold Aridisols and Vertisols, Washington, D.C., U.S. Soil Conservation Service, 1991, p.43-53, PB91-220483, 33 refs.
Falen, A.L., Blank, R.R., Hipple, K.W.
Soil formation, Cryogenic soils, Soil temperature, Soil chemistry, Soil dating, Periglacial processes, Soil surveys, Thermal regime, United States—Idaho.

46-5154
Altocryic aridisols in China.
Gong, Z.T., et al, International Soil Correlation Meeting, 6th, Aug. 6-18, 1989. Proceedings. Edited by J.M. Kimble. Characterization, classification, and utilization of cold Aridisols and Vertisols, Washington, D.C., U.S. Soil Conservation Service, 1991, p.54-60, PB91-220483, 5 refs.
Gu, G.A.
Cryogenic soils, Soil surveys, Desert soils, Mountain soils, Soil classification, Soil chemistry, Soil temperature, China.

46-5155
Properties and classification of cold Aridisols in Montana.
Wang, C., et al, International Soil Correlation Meeting, 6th, Aug. 6-18, 1989. Proceedings. Edited by J.M. Kimble. Characterization, classification, and utilization of cold Aridisols and Vertisols, Washington, D.C., U.S. Soil Conservation Service, 1991, p.81-91, PB91-220483, 14 refs.
Cryogenic soils, Soil surveys, Soil classification, Soil water, Soil temperature, Soil chemistry, United States—Montana.

46-5156
Thermal regime and morphology of clay soils in Manitoba, Canada.
Mills, G.F., et al, International Soil Correlation Meeting, 6th, Aug. 6-18, 1989. Proceedings. Edited by J.M. Kimble. Characterization, classification, and utilization of cold Aridisols and Vertisols, Washington, D.C., U.S. Soil Conservation Service, 1991, p.122-132, PB91-220483, 15 refs.
Eilers, R.G., Veldhuis, H.
Cryogenic soils, Clay soils, Soil classification, Soil temperature, Soil surveys, Soil formation, Thermal regime, Canada—Manitoba.

46-5157
Periglacial features as sources of variability in Wyoming Aridisols.
Munn, L.C., International Soil Correlation Meeting, 6th, Aug. 6-18, 1989. Proceedings. Edited by J.M. Kimble. Characterization, classification, and utilization of cold Aridisols and Vertisols, Washington, D.C., U.S. Soil Conservation Service, 1991, p.133-137, PB91-220483, 17 refs.
Cryogenic soils, Desert soils, Soil formation, Soil surveys, Periglacial processes, Soil chemistry, Patterned ground, United States—Wyoming.

46-5158
Reclamation management and techniques for cold Entisols in southwestern Wyoming.
Parady, F.E., et al, International Soil Correlation Meeting, 6th, Aug. 6-18, 1989. Proceedings. Edited by J.M. Kimble. Characterization, classification, and utilization of cold Aridisols and Vertisols, Washington, D.C., U.S. Soil Conservation Service, 1991, p.146-150, PB91-220483, 8 refs.
Hargis, N.E.
Cryogenic soils, Desert soils, Land reclamation, Soil conservation, Mining, United States—Wyoming.

46-5159
Salinity development, recognition, and management in North Dakota soils.
Richardson, J.L., et al, International Soil Correlation Meeting, 6th, Aug. 6-18, 1989. Proceedings. Edited by J.M. Kimble. Characterization, classification, and utilization of cold Aridisols and Vertisols, Washington, D.C., U.S. Soil Conservation Service, 1991, p.159-165, PB91-220483, 48 refs.
Hopkins, D.G., Seelig, B.E., Sweeney, M.D.
Saline soils, Soil conservation, Land reclamation, Soil freezing, Soil chemistry, Wetlands, Soil surveys, United States—North Dakota.

46-5160
Clayey soils of northern Canada and the Cordillera.
Tarnocai, C., et al, International Soil Correlation Meeting, 6th, Aug. 6-18, 1989. Proceedings. Edited by J.M. Kimble. Characterization, classification, and utilization of cold Aridisols and Vertisols, Washington, D.C., U.S. Soil Conservation Service, 1991, p.208-226, PB91-220483, 23 refs.
Cryogenic soils, Clay soils, Soil classification, Soil surveys, Cryoturbation, Solifluction, Soil chemistry, Permafrost, Canada.

46-5161
Geomorphology of cold deserts.
Palmquist, R.C., International Soil Correlation Meeting, 6th, Aug. 6-18, 1989. Proceedings. Edited by J.M. Kimble. Characterization, classification, and utilization of cold Aridisols and Vertisols, Washington, D.C., U.S. Soil Conservation Service, 1991, p.248-253, PB91-220483, 14 refs.
Cryogenic soils, Desert soils, Geomorphology, Frost action, Paleoclimatology.

46-5162
Potential airfield sites in Antarctica for wheeled aircraft.
Swithinbank, C., *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* Dec. 1991, SR 91-24, 68p., ADA-249 503, 16 refs.
Ice runways, Site surveys, Aerial surveys, Site accessibility, Logistics, Airplanes, Antarctica.
This is a report on a search for possible or potential airfield sites in Antarctica, using aerial photographs and satellite images supplemented by other data. A few sites are on ice-free ground but the majority are on inland blue ice fields. Earlier studies of potential airfields on antarctic glacier ice are referenced. The attraction of a well-chosen blue-ice runway is that construction and maintenance costs are almost nil. A number of sites have been found suitable for the operation of unmodified transport aircraft on wheels. An inland icefield site on Mill Glacier is in use for wheel landings by LC-130 aircraft; another at Patriot Hills is in use for wheel landings by DC-6 aircraft. (Auth.)

46-5163
Antarctic ice charts 1989-1990.
U.S. Naval Polar Oceanography Center, Suitland, MD, 1992, n.p. ADA-249 730.
Ice surveys, Sea ice distribution, Ice cover thickness, Ice edge, Ice reporting, Maps, Antarctica.
A compilation of the weekly sea ice analyses produced by the Navy NOAA Joint Ice Center. The Antarctica Ice Charts are produced bi-annually every even numbered year (i.e. 1990, 1992 etc.) by June or July.

46-5164
Frost heave patterns and optimal design of insulated culverts.
Duquennoi, C., et al, *Minnesota Local Road Research Board. Report*, June 1991, MN/RC-91/08, 26p., PB91-241307, 7 refs.
Sterling, R.L.
Road maintenance, Frost protection, Frost heave, Culverts, Thermal insulation.

46-5165
Use of geogrids for limiting longitudinal cracking in roads on permafrost.
Savage, B.M., *Alaska. Department of Transportation and Public Facilities. Report*, May 1991, AK-RD-91-12, 107p., PB91-211235, 30 refs.
Permafrost beneath roads, Permafrost preservation, Frost protection, Soil stabilization, Frozen ground strength, Synthetic materials, Cracking (fracturing), Mathematical models, Geotextiles.

46-5166
Determination of subsurface conditions of frozen ground layers using surface waves at three permafrost sites in Fairbanks, Alaska, U.S.A.
Olson, L.D., et al, *U.S. National Science Foundation. Report*, Sep. 1988, NSF/ISI-88129, 104p., PB91-199711, 28 refs.
Stokoe, K.H., Nazarian, S.
Permafrost surveys, Permafrost depth, Permafrost thickness, Seismic surveys, Site surveys, Frozen ground strength, Subsurface investigations, Soil profiles, Permafrost structure, United States—Alaska—Fairbanks.

46-5167
Naval arctic manual. ATP 17(A).
U.S. Naval Arctic Research Laboratory, Barrow, AK, 1991, Var. p. PB91-193920.
Ice navigation, Cold weather operation, Cold weather survival, Subglacial navigation, Manuals.

46-5168
ECC ozonesonde observations at Point Barrow, Alaska during January 16-April 19, 1989.
Komhyr, W.D., et al, *U.S. National Oceanic and Atmospheric Administration. Environmental Research Laboratories. Climate Monitoring and Diagnostics Laboratory. Data report*, Mar. 1991, NOAA-DR-ERL-CMDL-7, 155p., PB91-176438, 7 refs.
Wendell, J., Lathrop, J.A.
Ozone, Atmospheric composition, Polar atmospheres, Stratosphere, Meteorological data, United States—Alaska—Point Barrow.

46-5169
Moisture-temperature relationships in a sand due to outward, radial freezing.
Juel, E.A., *Alaska. Department of Transportation and Public Facilities. Report*, May 1989, AK-RD-90-15, 162p., PB91-174144, Refs. p.155-162.
Soil freezing, Soil water migration, Sands, Frozen ground thermodynamics, Frozen ground strength, Soil stabilization, Freezing front, Mathematical models.

46-5170
Design of physical cloud seeding experiments for the Arizona atmospheric modification research program.
Super, A.B., et al, *U.S. Bureau of Reclamation. Report*, Feb. 1991, R-91-02, 91p., PB91-174136, 61 refs.
Medina, J.G., McPartland, J.T.
Cloud seeding, Snow manufacturing, Weather modification, Artificial snow, Snow retention, Water reserves, Environmental impact, Cost analysis, United States—Arizona.

46-5171
Determining feasibility of West Virginia oil and gas field brines as highway deicing agents. Phase 3. Final report.
Eck, R.W., et al, *West Virginia Department of Highways. Research project*, May 1991, WVDOH-RP-76, 178p., PB91-226894, 17 refs.
Sack, W.A.
Road maintenance, Chemical ice prevention, Ice removal, Brines.

46-5172
Antarctic tropospheric clouds characterization using an elastic backscattering Lidar.
Morandi, M., et al, *Italian Research on Antarctic Atmosphere, Conference proceedings*, Vol.20, Bologna, Italian Physical Society, 1989, p.111-120, 14 refs.
Ozone, Lidar, Antarctica—Terra Nova Bay Station.
The Lidar Group of IROE is used by the Italian national program of research in Antarctica (PNRA) in two projects: the ozone hole phenomenon and antarctic climatology. In this paper, the research activities on antarctic tropospheric clouds carried out during the 1987-1988 season at the Terra Nova Bay Station are described. Future activities, dealing mainly with the ECLIPS (Experimental Clouds Lidar Pilot Study) international project, are outlined. Some experimental data are presented and the processing methods are described. (Auth. mod.)

46-5173
Meteorological variables and ozone concentration measured in the surface layer at the Italian station of Terra Nova Bay, Antarctica.
Bonasoni, P., et al, Italian Research on Antarctic Atmosphere, Conference proceedings, Vol.20, Bologna, Italian Physical Society, 1989, p.123-136, 19 refs.
Giovanelli, G., Georgiadis, T., Tagliazucca, M.
Ozone, Meteorological data, Antarctica—Terra Nova Bay Station.
Microclimatological, meteorological and environmental measurements were performed during Jan. and Feb. 1987-1988 at Terra Nova Bay Station to determine certain characteristics of the atmospheric surface layer, such as profiles of wind, temperature and ozone concentration versus stability. Only qualitative results are presented. The temperature measurements at various levels up to 6 m indicate that the profile is quasi permanently superadiabatic. This behavior is due to the high incoming radiation and transparency of the atmosphere. Ozone concentration measurements at 3 levels up to 10 m, averaged over 10 minutes, display profiles characterized by strong gradients. The maximum concentrations (about 30 ppb for periods of 3-4 hours) were observed in the early afternoon in connection with southeasterly winds. (Auth. mod.)

46-5174
Application of lidar for the antarctic stratospheric research.
Stefanutti, L., et al, Italian Research on Antarctic Atmosphere, *Conference proceedings, Vol.20, Bologna*, Italian Physical Society, 1989, p.161-170, 13 refs.
Ozone, Stratosphere, Clouds (meteorology), Lidar.
The mechanism of stratospheric cloud formation is described, and the usefulness of a simple elastic backscattering lidar for their observation is discussed. Some results obtained from lidar stratospheric aerosol measurements, carried out during the 1987-1988 season, are reported and presented in charts. Details are given of the design of the DIAL lidar system presently under construction to be used in measurements of the antarctic ozone hole.

46-5175
Role of stratospheric clouds in the polar ozone depletion: modelling denitrification and dehydration.
Gobbi, G.P., Italian Research on Antarctic Atmosphere, Conference proceedings, Vol.20, Bologna, Italian Physical Society, 1989, p.171-173, 13 refs.
Ozone, Stratosphere, Clouds (meteorology).
From a brief analysis of pertinent literature, the following conclusions are made: polar stratospheric clouds (PSCs) are regarded as major contributors to the process of ozone depletion over Antarctica. In particular, PSCs appear to have a twofold effect: they denitrify and dehydrate the stratosphere and provide the surfaces onto which ozone related reactions can take place.

46-5176
Balloon-borne CCD sonde for observations of stratospheric ice crystals.
Adriani, A., et al, Italian Research on Antarctic Atmosphere, Conference proceedings, Vol.20, Bologna, Italian Physical Society, 1989, p.175-178, 9 refs.
Gobbi, G.P., Viterbini, M., Ugazio, S.
Stratosphere, Ozone, Clouds (meteorology), Ice crystals.
A proposal for in-situ inspection of polar stratospheric clouds (PSCs) was approved by the Italian Antarctic Program in 1988. A balloon-borne sonde for observations of PSC ice crystals larger than 4 microns is under development. The instrument will use microscopic techniques and CCD detection to provide images of the larger and most irregular constituents of PSCs. The sonde will ascend up to heights of approximately 20 km, thus exploring the region of maximum ozone depletion of the polar springtime stratosphere. (Auth.)

46-5177
Ozone hole simulation using a prescribed dynamical field.
Pitari, G., et al, Italian Research on Antarctic Atmosphere, Conference proceedings, Vol.20, Bologna, Italian Physical Society, 1989, p.179-196, Refs. p.194-196.
Verdecchia, M., Visconti, G.
Ozone, Stratosphere, Simulation, Meteorological charts, Atmospheric composition, Mathematical models.
Different theories have been proposed recently to explain the origin and evolution in time of the ozone hole in the antarctic polar region. It is suggested that many of these theories require pure chemical perturbations, while others deal with dynamical and thermodynamical processes. It is proposed that what seems most likely is a combination of the two aspects. The numerical experiment described follows this guideline. A three dimensional transport model for the ozone was built, using the velocity and temperature fields obtained from the GFDL SKYHI-N90 model. This model covers the entire globe horizontally (with a resolution of 5 deg latitude and 18 deg longitude) and uses a total of 40 pressure levels (as in the GFDL model). Results show that chemistry and dynamics are strictly connected in the ozone hole formation and persistence.

46-5178
Measurements of the ozone column amount at Terra Nova Bay. Preliminary results.
Valenti, C., et al, Italian Research on Antarctic Atmosphere, Conference proceedings, Vol.20, Bologna, Italian Physical Society, 1989, p.215-220, 4 refs.
Ozone, Spectroscopy, Meteorological instruments, Antarctica—Terra Nova Bay.
During the 3rd Italian Antarctic Expedition (Dec. 1987-Feb. 1988), ozone measurements were made at Terra Nova Bay using for the first time the Brewer spectrophotometer. The instrument and type of measurements are described. The data are examined and compared to those collected with a Dobson spectrometer during the same period at Amundsen-Scott and Showa stations. It is concluded that, due to insufficiency of data, it is not possible to confirm or deny existing theories regarding the time and form of the ozone hole formation. (Auth. mod.)

46-5179
Model of the rate of frost shattering: application to field data from Japan, Svalbard and Antarctica.
Matsuoka, N., *Permafrost and periglacial processes*, Oct.-Dec. 1991, 2(4), Workshop on Mechanical Weathering, Caen, France, Apr. 29-May 2, 1991. Proceedings, p.271-281, With French summary. 26 refs.
Geocryology, Periglacial processes, Frost shattering, Frozen rock strength, Freeze thaw cycles, Bedrock, Frost weathering, Mathematical models, Tensile properties, Antarctica—Sör Rondane Mountains.
An empirical model of the rate of bedrock frost shattering was applied to field data obtained from four different environments: Japanese lowland and alpine regions, Svalbard, and Antarctica. The model indicates that the annual frost shattering rate is a function of freeze-thaw frequency per year, degree of saturation and bedrock tensile strength. Field measurements of these parameters were carried out for 1-6 years on rockwalls in the four study areas. Despite the differences in thermal and moisture conditions, the model agreed fairly well with field data, with the exception of those from Antarctica and part of Svalbard, where moisture is insufficient for frost shattering. The model predicts the weathering rates of bedrock situated in environments where frost shattering prevails. (Auth.)

46-5180
Weathering by segregation ice growth in microcracks at sustained sub-zero temperatures: verification from an experimental study using acoustic emissions.
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Walder, J.S., Stubbs, C.W.
Geocryology, Frost shattering, Frost weathering, Ice growth, Ice lenses, Crack propagation, Water transport, Acoustic measurement, Periglacial processes, Cracking (fracturing), Lithology, Microstructure.

46-5181
Frost heave mechanism in welded tuff.
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Fukuda, M.
Geocryology, Frozen rocks, Periglacial processes, Ice growth, Ice lenses, Frost heave, Frost weathering, Unfrozen water content, Cracking (fracturing), Freezing front, Ice solid interface.

46-5182
Rock properties as controls on free-face debris fall activity.
Douglas, G.R., et al, *Permafrost and periglacial processes*, Oct.-Dec. 1991, 2(4), Workshop on Mechanical Weathering, Caen, France, Apr. 29-May 2, 1991. Proceedings, p.311-319, With French summary. 43 refs.
Whalley, W.B., McGreevy, J.P.
Periglacial processes, Slope stability, Rock properties, Frost weathering, Cracking (fracturing), Frost shattering, Geomorphology, Geocryology, Microstructure.

46-5183
Rock moisture data from the Juneau Icefield (Alaska) and its significance for mechanical weathering studies.
Hall, K., *Permafrost and periglacial processes*, Oct.-Dec. 1991, 2(4), Workshop on Mechanical Weathering, Caen, France, Apr. 29-May 2, 1991. Proceedings, p.321-330, With French summary. 23 refs.
Periglacial processes, Rock properties, Weathering, Water content, Saturation, Climatic factors, Low temperature tests.

46-5184
Evidence for enhanced mechanical weathering associated with seasonally late-lying and perennial snow patches, Jotunheimen, Norway.
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Periglacial processes, Nivation, Snow cover effect, Rocks, Weathering, Cracking (fracturing), Surface properties, Lithology, Snowmelt.

46-5185
Contribution of W.R.B. Battle to mechanical weathering studies.
Whalley, W.B., et al, *Permafrost and periglacial processes*, Oct.-Dec. 1991, 2(4), Workshop on Mechanical Weathering, Caen, France, Apr. 29-May 2, 1991. Proceedings, p.341-346, With French summary. 11 refs.
McGreevy, J.P.
Rock properties, Geocryology, Frost weathering, Rock mechanics, Frozen rock strength, Frost shattering, Freeze thaw cycles, Meltwater, Glacial erosion.

46-5186
Frost weathering of rocks in the presence of salts—a review.
Williams, R.B.G., et al, *Permafrost and periglacial processes*, Oct.-Dec. 1991, 2(4), Workshop on Mechanical Weathering, Caen, France, Apr. 29-May 2, 1991. Proceedings, p.347-353, With French summary. 39 refs.
Robinson, D.A.
Geocryology, Saturation, Frost weathering, Frozen rock mechanics, Salinity, Ice crystal growth, Frost shattering, Ice pressure, Solutions, Periglacial processes.

46-5187
Low temperature environment operations of turboengines (design and user's problems).
Advisory Group for Aerospace Research and Development, *AGARD conference proceedings*, 1991, AGARD-CP-480, Var. p., ADA-238 324, In English and French. Refs. passim. Proceedings of the 76th Propulsion and Energetics Panel Symposium, Brussels, Belgium, Oct. 8-12, 1990. For individual papers see 46-5188 through 46-5220.
Aircraft icing, Jet engines, Engine starters, Cold weather performance, Helicopters, Ice prevention, Ice accretion, Fuels, Military engineering, Military equipment.

46-5188
Low temperature environment operation of turbo engines—a military operator's experience and requirements.
Summerton, M., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.1/1-1/3, ADA-238 324.
Aircraft icing, Jet engines, Cold weather performance, Military engineering, Military equipment, Helicopters.

46-5189
Low temperature environment operations of turbo engines.
Ouellette, C., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.2/1-2/3, ADA-238 324.
Aircraft icing, Jet engines, Cold weather performance, Military engineering, Military equipment.

46-5190
Analysis of cold starting problems with Astazou helicopter turbo engines. [Analyse des problemes de demarrage par temps froid avec les turbomoteurs d'helicoptere de type Astazou].
Pieters, W., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.3/1-3/6, ADA-238 324, In French with English summary. 2 refs.
Aircraft icing, Jet engines, Helicopters, Cold weather performance, Engine starters, Military engineering, Military equipment.

46-5191
Mystere-Falcon commercial aircraft—cold weather operational experience. [Avions d'affaires Mystere-Falcon—expérience opérationelle par temps froid].
Domenc, C., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.4/1-4/12, ADA-238 324, In French.
Aircraft icing, Jet engines, Cold weather performance.

46-5192
Vulnerability of a small powerplant to wet snow conditions.
Meijn, R., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.5/1-5/6, ADA-238 324.
Aircraft icing, Jet engines, Helicopters, Wet snow, Snow loads, Cold weather performance.

46-5193
Ice tolerant engine inlet screens for CH113/113A search and rescue helicopters.
Jones, R.B., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.6/1-6/11, ADA-238 324, 11 refs.
Lucier, W.A.
Aircraft icing, Jet engines, Helicopters, Ice prevention, Cold weather performance, Rescue operations, Rescue equipment, Military engineering, Military equipment.

46-5194
Cold starting small gas turbines—an overview.
Rodgers, C., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.7/1-7/22, ADA-238 324, With French summary. 24 refs.
Aircraft icing, Jet engines, Engine starters, Cold weather performance, Military engineering, Military equipment.

46-5195
Cold start optimization on a military jet engine.
Gruber, H., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.8/1-8/5, ADA-238 324.
Aircraft icing, Jet engines, Engine starters, Cold weather performance, Military engineering, Military equipment.

46-5196
Cold weather ignition characteristics of advanced small gas turbine combustion systems.
Critchley, I., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.9/1-9/7, ADA-238 324, 3 refs.
Sampath, P., Shum, F.
Aircraft icing, Jet engines, Engine starters, Cold weather performance.

46-5197
Cold weather jet engine starting strategies made possible by engine digital control systems.
Wibbelsman, R.C., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.10/1-10/14, ADA-238 324.
Aircraft icing, Jet engines, Engine starters, Cold weather performance, Computer applications.

46-5198
Cold start investigation of an APU with annular combustor and fuel vaporizers.
Collin, K.H., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.11/1-11/18, ADA-238 324, 1 ref.
Piel, K.
Jet engines, Engine starters, Cold weather performance, Military engineering, Military equipment.

46-5199
Control system design considerations for starting turbo-engines during cold weather operation.
Pollak, R.R., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.12/1-12/10, ADA-238 324, 2 refs.
Jet engines, Engine starters, Cold weather performance, Computer applications

46-5200
Cold start development of modern small gas turbine engines at Pratt and Whitney Canada.
Breitman, D.S., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.13/1-13/7, ADA-238 324.
Yeung, F.K.
Jet engines, Engine starters, Cold weather performance.

46-5201
Design considerations based upon low temperature starting tests on military aircraft turbo engines.
Feig, H.F., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.14/1-14/16, ADA-238 324, 6 refs.
Jet engines, Engine starters, Cold weather performance, Military engineering, Military equipment.

46-5202
Climatic considerations in the life cycle management of the CF-18 engine.
Cue, R.W., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.15/1-15/15, ADA-238 324.
Muir, D.E.
Jet engines, Cold weather performance, Life (durability), Monitors, Maintenance, Military engineering, Military equipment.

46-5203
Application of a water droplet trajectory prediction code to the design of inlet particle separator anti-icing systems.
Mann, D.L., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.16/1-16/11, ADA-238 324, 16 refs.
Tan, S.C.
Aircraft icing, Jet engines, Ice forecasting, Ice prevention, Ice accretion, Cloud droplets, Helicopters, Mathematical models.

46-5204
Ice collection on an air intake prerotation vane. [Captation de glace sur une aube de prerotation d'entrée d'air].
Henry, R., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.17/1-17/8, ADA-238 324, In French. 3 refs.
Guffond, D.
Aircraft icing, Jet engines, Ice forecasting, Ice prevention, Ice accretion, Helicopters, Mathematical models.

46-5205
Development of an anti-icing system for the T800-LHT-800 turboshaft engine.
Bianchini, G.V., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.18/1-18/13, ADA-238 324.
Aircraft icing, Jet engines, Ice prevention, Helicopters, Military engineering, Military equipment.

46-5206
Engine icing criticality assessment.
Brook, E., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.19/1-19/6, ADA-238 324.
Aircraft icing, Jet engines, Ice forecasting, Ice detection, Ice prevention, Ice loads, Cold weather performance, Design criteria.

46-5207
Ice ingestion experience on a small turboprop engine.
Blair, L.W., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.20/1-20/9, ADA-238 324.
Miller, R.L., Tapparo, D.J.
Aircraft icing, Jet engines, Ice loads, Ice prevention, Cold weather performance, Cold weather tests, Impact tests.

46-5208
Fuels and oils as factors in the operation of aero gas turbine engines at low temperatures.
Batchelor, G.L., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.21/1-21/7, ADA-238 324.
Jet engines, Fuels, Lubricants, Cold weather performance.

46-5209
Effect of fuel properties and atomization on low temperature ignition in gas turbine combustors.
Naegeli, D.W., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.22/1-22/10, ADA-238 324, 24 refs.
Dodge, L.G., Moses, C.A.
Jet engines, Engine starters, Fuels, Cold weather performance.

46-5210
Icing of turboreactor fuel lines. [Givrage des circuits de carburant des turboréacteurs].
Garnier, F., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.23/1-23/22, ADA-238 324, In French.
Aircraft icing, Jet engines, Fuels, Cold weather performance.

46-5211
Influence of fuel characteristics on heterogeneous flame propagation.
Bardon, M.F., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.24/1-24/9, ADA-238 324, 25 refs.
Gauthier, J.E.D., Rao, V.K.
Jet engines, Engine starters, Fuels, Cold weather performance, Mathematical models.

46-5212
Development of a computational model to predict low temperature fuel flow phenomena.
Kamin, R.A., et al, AGARD conference proceedings, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.25/1-25/13, ADA-238 324, 17 refs.
Nowack, C.J., Olmstead, B.A.
Jet engines, Fuels, Cold weather performance, Fluid flow, Mathematical models.

46-5213
Environmental icing testing at the Naval Air Propulsion Center.
Reardon, W.H., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.28/1-28/18, ADA-238 324, 12 refs.
Truglio, V.J.
Aircraft icing, Jet engines, Ice accretion, Ice loads, Cold weather performance, Military research, Test chambers, Environment simulation.

46-5214
Icing research related to engine icing characteristics.
Riley, S.J., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.29/1-29/12, ADA-238 324, 1 ref.
Aircraft icing, Jet engines, Ice accretion, Wind tunnels.

46-5215
Numerical modeling of the evolution of a supercooled water droplet cloud in an icing tunnel. [Modelisation numérique de l'evolution d'un nuage de gouttelettes d'eau en surfusion dans un caisson givrant].
Creismeas, P., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.30/1-30/10, ADA-238 324, In French with English summary. 10 refs.
Courquet, J.
Aircraft icing, Ice accretion, Supercooled clouds, Wind tunnels, Mathematical models.

46-5216
Icing test capabilities for aircraft propulsion systems at the Arnold Engineering Development Center.
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Moore, J.R., Weinberg, N.S., Garretson, T.D.
Aircraft icing, Jet engines, Ice accretion, Military research, Test chambers, Environment simulation.

46-5217
Icing test programmes and techniques.
Carr, E., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.32/1-32/8, ADA-238 324.
Woodhouse, D.
Aircraft icing, Jet engines, Helicopters, Cold weather performance, Test chambers, Environment simulation.

46-5218
Documentation of vertical and horizontal aircraft soundings of icing relevant cloud physical parameters.
Hoffmann, H.E., *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.33/1-33/14, ADA-238 324, 12 refs.
Aircraft icing, Ice accretion, Supercooled clouds, Sounding, Probes.

46-5219
Developments in icing test techniques for aerospace applications in the RAE Pyestock altitude test facility.
Holmes, M., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.34/1-34/15, ADA-238 324, 12 refs.
Garratt, V.E.W., Drage, R.G.T.
Aircraft icing, Wind tunnels, Jet engines, Cold weather performance, Ice accretion.

46-5220
Helicopter air intake: protection in flights during snow or icing conditions. [Entrée d'air d'hélicoptères: protection pour le vol en conditions neigeuses ou givrantes].
De la Servette, X., et al, *AGARD conference proceedings*, 1991, AGARD-CP-480, Low temperature environment operations of turboengines (design and user's problems), p.35/1-35/9, ADA-238 324, In French.
Cabrit, P.
Aircraft icing, Jet engines, Helicopters, Ice prevention, Cold weather performance.

46-5221
Control strategy for an icebreaker propulsion system.
Hill, W.A., et al, *IEEE transactions on industry applications*, Aug. 1992, 28(4), p.887-892, 5 refs.
Creelman, G., Mischke, L.
Icebreakers, Design, Diesel engines, Electric power, Propellers, Performance, Ice cover effect, Analysis (mathematics).

46-5222
Low-energy electron diffraction study of a disordered monolayer of H2O on Pt(111) and an ordered thin film of ice grown on Pt(111).
Starke, U., et al, *Journal of vacuum science & technology A*, July-Aug. 1992, 10(4)Pt.3, National Symposium of the American Vacuum Society, 38th, Seattle, WA, Nov. 11-15, 1991. Proceedings, p.2521-2527, 31 refs.
Ice physics, Ice spectroscopy, Surface structure, Adsorption, Ice solid interface, Water films, Spectra, Imaging, Low temperature research.

46-5223
Influence of curvature of silica particle surface and temperature on thickness of nonfreezing water interlayers.
Bardasov, S.A., et al, *Colloid journal of the USSR*, May 1992, 53(6), p.828-833, Translated from Kolloidnĭ zhurnal, 1991, No.6. 21 refs.
Sobolev, V.D., Churaev, N.V.
Colloids, Frozen liquids, Dispersions, Unfrozen water content, Hygroscopic water, Ice formation, Phase transformations, Layers, Capillarity, Temperature effects.

46-5224
Heterogeneous nucleation of ice on the surface of a liquid drop.
Kuz'min, V.L., et al, *Colloid journal of the USSR*, May 1992, 53(6), p.876-879, Translated from Kolloidnĭ zhurnal, 1991, No.6. 13 refs.
Dubrivich, N.A., Dovagaliuk, IU.A.
Colloids, Drops (liquids), Ice physics, Heterogeneous nucleation, Electric fields, Polarization (charge separation), Ice formation, Surface properties, Ionization.

46-5225
Role of silicon as a limiting nutrient to antarctic diatoms: evidence from kinetic studies in the Ross Sea ice-edge zone.
Nelson, D.M., et al, *Marine ecology progress series*, Mar. 1992, 80(2-3), p.255-264, 48 refs.
Tréguer, P.
Algae, Nutrient cycle, Ice edge, Sea water, Water chemistry, Antarctica--Ross Sea.

During the austral summer of 1990 an intense diatom-dominated, ice-edge phytoplankton bloom in the southwestern Ross Sea resulted in depletion of silicic acid, nitrate and phosphate to concentrations much lower than is typical for antarctic surface waters. Silicic acid was depleted to < 6 microM within the core of the meltwater field, where biogenic particulate silica concentrations exceeded 20 micromol l. Three Si uptake kinetic experiments were conducted on natural phytoplankton assemblages from the nutrient-depleted zone. Si30-labeled Si(OH)4 was used to measure the uptake rate at concentrations ranging from 1 to 20 microM above ambient. Dependence of the specific uptake rate on silicic acid concentration conformed well to a Michaelis-Menten saturation model; maximum uptake rates ranged from 0.0022 to 0.0028 h which corresponds to maximum growth rates of 0.08 to 0.10 doublings d. Half-saturation constants ranged from 1.1 to 4.6 microM, a range similar to values found in other areas of the ocean and considerably lower than those previously reported for several antarctic diatom species in culture studies. Results indicate detectable but weak substrate limitation of silicic acid uptake rate by the naturally occurring diatom assemblage in the western Ross Sea. Significant Si limitation in other subsystems of the southern ocean would be possible only if their resident diatom assemblages had much lower affinity for silicic acid than the authors observed. (Auth.)

46-5226
High-resolution sampler for nutrient and chlorophyll *a* profiles of the sea ice platelet layer and underlying water column below fast ice in polar oceans: preliminary results.
Dieckmann, G.S., et al, *Marine ecology progress series*, Mar. 1992, 80(2-3), p.291-300, 39 refs.
Arrigo, K., Sullivan, C.W.
Instruments, Water chemistry, Sea ice, Ice composition, Antarctica--McMurdo Sound.
Fourteen profiles of inorganic nutrients and chl *a* were obtained using ADONIS under fast ice near McMurdo Station. All profiles revealed highest chl *a* concentrations at the congelation - platelet ice interface. Maximum chl *a* concentration, under 2.5 m congelation ice, ranged between 5.20 and 853 microgram l from 26 Oct. to 3 Dec. 1989, but was only 0.35 microgram l under 4 m thick ice with a 0.4 m snow cover. Ammonium concentrations in the interstitial water of the platelet ice layer always exceeded those in the underlying water column by at least an order of magnitude, with maximum values per profile ranging from 3.20 to 178 micromol NH4 l. Concentrations of phosphate, nitrate, and silicic acid in the platelet ice layer differed only slightly from those in the water column, except in the presence of high algal biomass, where they were somewhat depleted but never exhausted. By the end of November, ammonium and phosphate at the interface of the congelation platelet ice layer had increased slightly relative to water column concentrations, indicating that regeneration exceeded uptake. Growth of the sea ice microbial community in the platelet layer does not appear to be nutrient-limited, as nutrients are apparently replenished by an adequate and efficient water exchange mechanism between platelet layer and underlying water column. (Auth. mod.)

46-5227
1987-1989 total ozone and ozone sounding observations in northern Scandinavia and Antarctica, and the climatology of the lower stratosphere during 1965-1988 in northern Finland.
Taalas, P., et al, *Journal of atmospheric and terrestrial physics*, Sep. 1992, 54(9), p.1089-1099, 16 refs.
Kyrö, E.
Ozone, Stratosphere, Clouds (meteorology).

46-5228
Observational signs of greenhouse-gas-induced climate change, with special reference to northern latitudes.
Schönwiese, C.D., *Journal of atmospheric and terrestrial physics*, Sep. 1992, 54(9), p.1101-1106, 14 refs.
Climatic changes, Atmospheric composition, Statistical analysis.

46-5229
Ozone variations in the Northern Hemisphere due to dynamic processes in the atmosphere.
Rabbe, A., et al, *Journal of atmospheric and terrestrial physics*, Sep. 1992, 54(9), p.1107-1112, 2 refs.
Larsen, S.H.H.
Ozone, Atmospheric composition, Atmospheric circulation, Wind (meteorology).

46-5230
On the stability of the ozone layer at Tromsö.
Henriksen, K., et al, *Journal of atmospheric and terrestrial physics*, Sep. 1992, 54(9), p.1113-1117, 10 refs.
Svenöe, T., Larsen, S.H.H.
Ozone, Atmospheric composition, Variations.

46-5231
Long-term variation of stratospheric temperature at the North Pole.
Kane, R.P., *Journal of atmospheric and terrestrial physics*, Sep. 1992, 54(9), p.1139-1148, 26 refs.
Air temperature, Stratosphere, Variations, North Pole.

46-5232
Bromoform emission from Arctic ice algae.
Sturges, W.T., et al, *Nature*, Aug. 20, 1992, 358(6388), p.660-662, 11 refs.
Cota, G.F., Buckley, P.T.
Sea ice, Algae, Microbiology, Chemical reactions.

46-5233
Acceleration of the rate of nitrite oxidation by freezing in aqueous solution.
Takenaka, N., et al, *Nature*, Aug. 27, 1992, 358(6389), p.736-738, 15 refs.
Ueda, A., Maeda, Y.
Freezing rate, Solutions, Chemical reactions.

46-5234
On the nature of the ice cap on the Tibetan Plateau during the late Quaternary.
Gupta, S.K., et al, *Global and planetary change*, June 1992, 5(4), p.339-343, 26 refs.
Sharma, P.
Paleoclimatology, Climatic changes, Ice sheets, Ice cores, Drill core analysis, Air temperature, Isotope analysis, Age determination.

46-5235
Ice storage: design study of the factors affecting installations.
Beggs, C.B., et al, *Building services engineering research and technology*, 1-92, 13(2), p.49-59, 9 refs.
Ward, I.C.
Air conditioning, Refrigeration, Ice makers, Ice (water storage), Performance, Cost analysis, Design criteria, Electric power, Climatic factors.

46-5236
Collection of *Peziza nivalis* from California with comments on the nomenclature of the snow bank *Pezizas*.
Pfister, D.H., *Mycotaxon*, Jan.-Mar. 1992, Vol.43, p.171-175, 11 refs.
Fungi, Classifications, Ecology, Snow cover effect, Snowmelt, Growth, Sampling.

46-5237
In the tracks of polar expeditions. [Po sledam poliarnykh ekspeditsii].
Belov, M.I., Leningrad, Gidrometeoizdat, 1977, 140p., In Russian. Refs. p.127-132.
History, Expeditions.

46-5238
Metallogenic aspects of cryolithogenesis. [Metallogenicheskie aspekty kriolitogeneza].
Karpunin, A.M., *Akademiia nauk SSSR. Doklady*, 1990, 313(2), p.427-429, In Russian. 11 refs.
Geocryology, Frozen rocks, Lithology.

46-5239
Natural analogs of alumina modifications (*delta*-Al2O3 and *theta*-Al2O3) in permafrost area sediments. [Prirodnye analogi modifikatsii glinozema (*delta*-Al2O3 and *theta*-Al2O3) v osadkakh oblasti vechnoi merzloty].
Zigert, Kh., et al, *Akademiia nauk SSSR. Doklady*, 1990, 313(3), p.689-692, In Russian. 9 refs.
Minerals, Sediments, Quaternary deposits.

46-5240
Bottom area of sharp decrease in ambient sea noise intensity under a cold oceanic eddy. [Pridonnaia oblast' rezkogo snizheniia intensivnosti shuma okeana pod kholodnym okeanicheskim vikhrem].
Kliachin, B.I., *Akademiia nauk SSSR. Doklady*, 1990, 313(3), p.711-715, In Russian. 10 refs.
Ocean bottom, Noise (sound), Underwater acoustics, Analysis (mathematics).

46-5241
Universal dry-cargo ships capable of ice navigating made in Spain. [Universal'nye sukhogruznye suda ledovogo plavaniia iz Ispanii].
Berezhnykh, O.A., *Sudostroenie*, Apr. 1991, No.4, p.9, In Russian. 2 refs.
Ships, Icebreakers.

46-5242
Evaluating the possibility of improving the efficiency of an advanced nuclear powered icebreaker. [Otsenka vozmozhnosti povysheniia ekonomichnosti AEU perspektivnogo ledokola].
Vorontsov, A.V., et al, *Sudostroenie*, June 1991, No.6, p.18-19, In Russian. 2 refs.
Goleevskii, G.I.
Icebreakers, Nuclear power, Design.

46-5243
Floating 70-megawatt nuclear power station for the North. [Plavuchaia atomnaia elektrostantsiia moshchnost'iu 70 MVt dlia Severa].
Kovalenko, V.K., et al, *Sudostroenie*, Sep. 1991, No.9, p.8-10, In Russian.
Tarasov, V.K.
Nuclear power, Offshore structures, Electric power, Cold weather operation.

46-5244
Experimental studies of stresses during the towing of transport ships through ice. [Eksperimental'noe issledovanie usilii pri buksirovke transportnykh sudov vo l'dakh].
Starshinov, V.A., et al, *Sudostroenie*, Mar. 1990, No.3, p.17-19, In Russian. 2 refs.
Ionov, B.P., Makeev, A.N.
Ships, Icebreakers, Ice navigation, Stresses.

46-5245
Modernization of the *Captain Sorokin* type of icebreakers. [Modernizatsiia ledokolov tipa *Kapitan Sorokin*].
Petrakov, E.V., *Sudostroenie*, Oct. 1990, No.10, p.3-5, In Russian. 2 refs.
Icebreakers, Design.

46-5246
Some problems in improving the ice-navigability of icebreakers and ice navigating ships. [Nekotorye voprosy povysheniia ledoprokhodimosti ledokolov i sudov ledovogo plavaniia].
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Klimashevskii, S.N.
Icebreakers, Ships, Ice navigation, Design.

46-5247
Characteristics of an icebreaker design for shoal water. [Osobennosti proektirovaniia ledokolov dlia melkovod'ia].
Bugakov, V.N., *Sudostroenie*, Oct. 1990, No.10, p.7-10, In Russian. 10 refs.
Icebreakers, Ships, Design.

46-5248
First powerful sea-going *Gamburg* type icebreaker. [O pervom moshchnom morskom ledokole *Gamburgskogo* tipa].
Kuz'menko, A.V., *Sudostroenie*, Oct. 1990, No.10, p.10-11, In Russian. 5 refs.
Icebreakers, Design, History.

46-5249
Turbo-supercharged unit of the pneumatic-wash system of an icebreaker hull. [Turbonadduvochnyi agregat sistemy pnevmoobmyva korpusa ledokola].
Boriskin, V.S., et al, *Sudostroenie*, Nov. 1990, No.11, p.12-15, In Russian.
Savinov, A.V.
Icebreakers, Machinery.

46-5250
Method of evaluating the efficiency of the electronic control generator in ice navigating ships. [Metodika otsenki effektivnosti GEU sudov ledovogo plavaniia].
Bolvashenkov, I.M., et al, *Sudostroenie*, Apr. 1989, No.4, p.31-32, In Russian. 9 refs.
Romanovskii, V.V., Shegalov, I.L.
Ships, Ice navigation, Icebreakers, Machinery.

46-5251
News about the building of icebreakers abroad. [Novosti zarubezhnogo ledokolostroeniia], *Sudostroenie*, July 1989, No.7, p.18-20, In Russian.
Icebreakers, Ships.

46-5252
Study of the effectiveness of ice-resistant coatings in protecting the hulls of icebreakers. [Issledovanie effektivnosti ledostoikikh pokrytii pri zashchite korpusov ledokolov],
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Shemendiuk, ?.
Icebreakers, ..ective coatings, Frost penetration, Frost protection, Resins, Analysis (mathematics).

46-5253
Precipitation nitrogen at maritime Signy Island and continental Cape Bird, Antarctica.
Greenfield, L.G., *Polar biology*, Mar. 1992, 11(8), p.649-653, 22 refs.
Snow composition, Chemical analysis, Precipitation (meteorology), Ecology, Antarctica—Signy Island, Antarctica—Bird, Cape.
The mineral nitrogen (NH4-N + NO3-N) in precipitation occurring at continental and maritime antarctic sites has been determined. Precipitation at sites remote from animal activity contained much less mineral-N than that occurring at sites influenced by such activity. Estimates for nitrogen input at two contrasting fellfield sites, one at continental Cape Bird (dry site), the other at maritime Signy I (wet site) are presented. At both sites precipitation N represented the major N input to fellfield biota, compared to wind blown particulate matter containing organic nitrogen or ammonia volatilized from adjacent guano soils and becoming absorbed by moist artificial soils traps. (Auth.)

46-5254
Vertical directivity of ice cracking.
Greening, M.V., et al, *Acoustical Society of America Journal*, Aug. 1992, 92(2)Pt.1, p.1022-1030, 26 refs.
Zakarauskas, P., Verrall, R.I.
Sea ice, Sound transmission, Ice acoustics, Underwater acoustics, Cracking (fracturing), Ice cover effect, Wave propagation, Ice water interface, Pack ice.

46-5255
Simulated polarization diversity lidar returns from water and precipitating mixed phase clouds.
Sassen, K., et al, *Applied optics*, May 20, 1992, 31(15), p.2914-2923, 25 refs.
Zhao, H.J., Dodd, G.C.
Lidar, Remote sensing, Cloud physics, Ice crystal optics, Polarization (waves), Backscattering, Cloud droplets, Precipitation (meteorology), Models, Light scattering.

46-5256
Investigation of the reactive and nonreactive processes involving ClONO2 and HCl on water and nitric acid doped ice.
Hanson, D.R., et al, *Journal of physical chemistry*, Mar. 19, 1992, 96(6), p.2682-2691, 24 refs.
Ravishankara, A.R.
Cloud physics, Scavenging, Simulation, Chemical properties, Ice vapor interface, Doped ice, Adsorption, Ozone, Chemical analysis, Temperature effects.

46-5257
Characterization of the (0001) surface of ice Ih crystal by crystal truncation rod scattering with the use of a synchrotron radiation source.
Goto, A., et al, *Journal of crystal growth*, July 1992, 121(3), p.360-364, 11 refs.
Ice physics, Ice crystal structure, Surface structure, X ray analysis, X ray diffraction, Molecular structure, Scattering, Phase transformations, Surface roughness.

46-5258
Ion flux through a shallow snowpack: effects of initial and melt conditions.
Petersen, C.E., Tucson, University of Arizona, 1990, 90p., University Microfilms No.AAC13441284, MS. thesis. For abstract see Master abstracts international, Vol.29(1), 1991, p.82.
Snow hydrology, Snowmelt, Ion diffusion, Snow composition, Chemical composition, Snow impurities, Freeze thaw cycles, Air pollution.

46-5259
Study of the ice-hail charge separation mechanism using a thunderstorm electrification model with explicit microphysics in a kinematic framework.
Norville, K.W., Seattle, University of Washington, 1990, 110p., University Microfilms order No.AAC9026013, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Oct. 1990, p.1712.
Cloud physics, Polarization (charge separation), Thunderstorms, Cloud electrification, Ice crystal collision, Hail, Charge transfer, Ice crystal growth, Mathematical models, Classifications.

46-5260
One-dimensional modeling study of carbonaceous haze effects on the springtime arctic environment.
Emery, C.A., San Jose, San Jose State University, 1990, 114p., University Microfilms order No.AAC1340509, MS. thesis. For abstract see Master abstracts international, Vol.28(4), 1990, p.560.
Polar atmospheres, Heat balance, Haze, Aerosols, Ice air interface, Climatic factors, Hydrocarbons, Radiation absorption, Global warming.

46-5261
Spring and summer sea ice and climate conditions in the Labrador Sea, 1800-present.
Newell, J.P., Boulder, University of Colorado, 1990, 345p., University Microfilms order No.AAC9122631, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Nov. 1991, p.2474.
Sea ice distribution, Seasonal variations, Ice conditions, Climatic changes, Air temperature, Ice breakup, Meteorological data.

46-5262
Numerical modelling of the development of glacial valley cross-sections.
Harbor, J.M., Seattle, University of Washington, 1990, 236p., University Microfilms order No.AAC9104244, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Mar. 1991, p.4237.
Glacial geology, Glacial erosion, Valleys, Alpine glaciation, Glacier flow, Ice solid interface, Mathematical models, Sliding, Landforms.

46-5263
Computational model of two-phase, turbulent atmospheric boundary layers containing blowing snow.
Liston, G.E., Bozeman, Montana State University, 1991, 161p., University Microfilms order No.AAC9124366, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1991, p.1499.
Atmospheric physics, Blowing snow, Turbulent boundary layer, Snow air interface, Turbulent flow, Mass transfer, Mathematical models, Snow accumulation.

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Attenuation of outdoor sound propagation levels by a snow cover.
Albert, D.G., San Diego, University of California, 1991, 278p., University Microfilms order No.AAC9130719, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Nov. 1991, p.2606.
Snow acoustics, Snow cover effect, Sound transmission, Wave propagation, Attenuation, Porosity, Snow air interface, Acoustic measurement, Seasonal variations.

46-5265
3-D transient microanalysis of multiphase heat and mass transport in ice lattices.
Christon, M.A., Fort Collins, Colorado State University, 1990, 146p., University Microfilms order No.AAC9029408, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Dec. 1991, p.3084.
Snow cover stability, Snow physics, Snow air interface, Microanalysis, Vapor diffusion, Ice crystal growth, Mass transfer, Mathematical models, Temperature gradients, Latticed structures.

46-5266
Microstructure-based constitutive theory for granular materials with snow as an example.
Mahajan, P., Bozeman, Montana State University, 1990, 161p., University Microfilms order No.AAC9103064, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Feb. 1991, p.3927.
Snow physics, Microstructure, Snow mechanics, Snow strength, Deformation, Strain tests, Theory.

46-5267
Numerical investigation of the dynamics of a variable thickness arctic ice cover.
Flato, G.M., Hanover, Dartmouth College, 1991, 196p., University Microfilms order No.AAC9130830, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Dec. 1991, p.3161.
Sea ice, Ice cover thickness, Pack ice, Pressure ridges, Distribution, Mathematical models, Ice models.

46-5268
Influence of impact, static and thermal loading on prestressed concrete at low temperatures.
Drake, S.R., United Kingdom, Council for National Academic Awards, 1990, 380p., University Microfilms order No.AACDX93355, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Dec. 1991, p.3189.
Prestressed concretes, Low temperature tests, Loading, Concrete strength, Cryogenics, Thermal stresses, Design criteria, Saturation, Temperature effects.

46-5269
Numerical investigation of the circulation of an ice covered Arctic Ocean.
Ranelli, P.H., Hanover, Dartmouth College, 1991, 172p., University Microfilms order No.AAC9130840, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Dec. 1991, p.2972.
Sea ice distribution, Ocean currents, Oceanography, Ice water interface, Thermodynamics, Ice cover effect, Mathematical models, Salinity, Ice forecasting.

46-5270
Clear sky net radiation model for the high elevation glacial environment.
Mountain, K.R., Columbus, Ohio State University, 1990, 308p., University Microfilms order No.AAC9031120, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Jan. 1991, p.3300.
Glacier surface, Radiation balance, Radiance, Mountain glaciers, Mathematical models.

46-5271
Glacier-climate relationships, West Gulkana Glacier, Alaska.
Chambers, F.B., Tempe, Arizona State University, 1990, 122p., University Microfilms order No.AAC9101860, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Feb. 1991, p.3752.
Glacier surveys, Glacier mass balance, Climatic factors, Glacier oscillation, Glaciology, Synoptic meteorology, Periodic variations.

46-5272
Experimental study of electric charging during ice growth and evaporation.
Dong, Y.Y., Reno, University of Nevada, 1990, 141p., University Microfilms order No.AAC9119933, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Aug. 1991, p.891.
Cloud physics, Cloud droplets, Ice vapor interface, Ice crystal growth, Charge transfer, Polarization (charge separation), Ice crystal collision, Simulation, Evaporation.

46-5273
Interdependence of the thermal and hydrologic processes of an arctic watershed and their response to climatic change.
Hinzman, L.D., Fairbanks, University of Alaska, 1990, 425p., University Microfilms order No.AAC9121902, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Sep. 1991, p.1318.
Watersheds, Arctic landscapes, Hydrologic cycle, Thermal regime, Climatic changes, Ground thawing, Permafrost transformation, Global warming, Water table.

46-5274
Liquid distributions in porous media.
Sutanto, E., Duluth, University of Minnesota, 1991, 283p., University Microfilms order No.AAC9125815, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Nov. 1991, p.2676.
Frozen rocks, Liquid solid interfaces, Porous materials, Cryogenics, Scanning electron microscopy, Microstructure, Laboratory techniques, Geocryology, Petroleum industry.

46-5275
New design method for frozen earth structures with reinforcement.
Sopko, J.A., Jr., East Lansing, Michigan State University, 1990, 200p., University Microfilms order No.AAC9117868, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, July 1991, p.411.
Soil stabilization, Cold weather construction, Artificial freezing, Soil freezing, Earthworks, Design, Soil mechanics, Soil strength.

46-5276
Production of air-entrained roller-compacted concrete mixtures in the laboratory.
Ragan, S.A., Mississippi State, Mississippi State University, 1990, 166p., University Microfilms order No.AAC1342101, MS. thesis. For abstract see Master abstracts international, Vol.29(2), 1991, p.302.
Concrete pavements, Concrete durability, Freeze thaw tests, Compaction, Air entrainment, Concrete admixtures, Frost protection, Mechanical tests, Physical properties.

46-5277
Efficiency of carbon assimilation and photoacclimation in a small unicellular *Chaetoceros* from the Weddell Sea (Antarctica): influence of temperature and irradiance.
Thomas, D.N., et al, *Journal of experimental marine biology and ecology*, May 27, 1992, 157(2), p.195-209, 46 refs.
Baumann, M.E.M., Gleitz, M.
Algae, Plankton, Photosynthesis, Sea ice, Laboratory techniques, Antarctica—Weddell Sea.
It is well established that antarctic phytoplankton and sea-ice algae are able to thrive at low temperatures, and it has been proposed that a reduction in respiration may be important in enabling them to do this. This possibility was studied in an antarctic clone of a small unicellular *Chaetoceros* species isolated from the Weddell Sea, using comparative measurements of C assimilation during long- and short-term incubation series over a range of temperatures (-1.5 to 4 C) at two irradiances (5 and 55 micromol s(-1) m s). Even though doubling times varied considerably, the total amount of C assimilated per cell per generation time was similar at each of the temperature and light conditions. However, over one cell cycle significant respiratory C losses were determined by divergences in C assimilation patterns between cumulative and long-term incubations at both light intensities at 0 and 4 C. At -1.5 C, insignificant C losses were recorded. No significant extracellular release of dissolved organic material (DOC) was observed. The photoacclimation potential of this species was also investigated over the same temperature range. Differences in photosynthetic parameters and Chl a concentrations between "low"- and "high"-light acclimated cells revealed a high photoacclimation capacity irrespective of incubation temperature. (Auth. mod.)

46-5278
Influence of physical and biological mesoscale dynamics on the seasonal distribution and behavior of *Euphausia superba* in the antarctic marginal ice zone.
Daly, K.L., et al, *Marine ecology progress series*, Dec. 1991, 79(1-2), p.37-66, Refs. p.64-66.
Macaulay, M.C.
Ecology, Sea ice, Ice edge, Cryobiology, Sea water, Water chemistry, Antarctica—Weddell Sea, Scotia Sea.
Physical processes control the extent of ice cover, the magnitude and location of food, and the distribution of pack ice predators; however, physical processes do not appear to directly affect krill. Instead, the seasonal distribution and behavior of krill was interpreted to be a function of the need to acquire food and avoid predators. These 2 factors also are hypothesized to be the proximate cause of swarming during this study. Seasonal sea ice plays an integral role in the ecology of krill. Ice-edge blooms are an important and predictable food supply, particularly for reproducing adults and first-feeding larvae. Ice floes provide protection for larvae and juveniles, and sea ice biota, a widespread food source, are important to the survival of larvae during winter. In the marginal ice zone, overwintering strategies of adults included regression to an immature (subadult) stage, reduction of metabolic rate, and omnivorous feeding in the water column. Adults were not observed feeding on the undersurface of ice floes, probably because of increased risk of predation from pack ice predators. However, adult krill may migrate deeper into the pack ice in winter and also feed on ice biota. It is concluded that sea ice biota act as a stabilizing mechanism against extreme seasonal oscillations of food supply for overwintering krill, thus contributing to the persistence of populations of *E. superba*. (Auth.)

46-5279
Program and proceedings. Environmental change: natural and man-made.
Arctic Science Conference, 43rd, Valdez, AK, Sep. 8-12, 1992, Fairbanks, University of Alaska, Geophysical Institute, 1992, 185p., Abstracts only. Sponsored by the American Association for the Advancement of Science.
Global warming, Air ice water interaction, Polar atmospheres, Environmental impact, Paleoclimatology, Soil air interface, Ecosystems, Human factors.

46-5280
Melting and freezing degree-days, 1961-1990 normals.
Canada, Atmospheric Environment Service, Ice Climatology Services, Ice Centre, Ottawa, Environment Canada, 1992, 105p., In English and French. 1 ref.
Degree days, Meteorological data, Freezing indexes, Weather stations, Air temperature, Statistical analysis, Canada.

46-5281
Different methods for the assessment of avalanche danger.
Buser, O., et al, *Cold regions science and technology*, Apr. 1985, 10(3), p.199-218, 50 refs.
Avalanche forecasting, Snow cover stability, Statistical analysis.

46-5282
Resistance to ship-hull motion through brash ice.
Kitazawa, T., et al, *Cold regions science and technology*, Apr. 1985, 10(3), p.219-234, 13 refs.
Ettema, R.
Ice navigation, Ice solid interface, Metal ice friction, Ice loads, Tanker ships, Test chambers, Channels (waterways), Mathematical models.

46-5283
Instrument for measuring frazil concentration.
Tsang, G., *Cold regions science and technology*, Apr. 1985, 10(3), p.235-249, 13 refs.
Frazil ice, Ice detection, Ice water interface, Ice electrical properties, Ice volume, River flow, Measuring instruments, Mathematical models.

46-5284
Simulation model of river ice cover thermodynamics.
Greene, G.M., et al. *Cold regions science and technology*, Apr. 1985, 10(3), p.251-262, 23 refs.
Outcalt, S.I.
River ice, Ice growth, Ice thermal properties, Ice cover thickness, Ice water interface, Ice deterioration, Ice breakup, Ice heat flux, Ice models, Mathematical models.

46-5285
Oscillation of a floating glacier tongue.
Vinogradov, O.G., et al. *Cold regions science and technology*, Apr. 1985, 10(3), p.263-271, 14 refs.
Holdsworth, G.
Glacier tongues, Calving, Glacier flow, Ice deformation, Ice water interface, Flexural strength, Ocean waves, Ice models, Mathematical models.

46-5286
Specimen preparation for ice research.
Garcia, N.B., *Cold regions science and technology*, Apr. 1985, 10(3), MP 3125, p.273-275, 4 refs.
Artificial ice, Ice sampling, Ice makers, Artificial freezing, Laboratory techniques.

46-5287
Effect of water absorption and UV-A-B radiation on the dielectric properties of selected plastics at frequencies between 100 Hz and 10 MHz.
Lechner, H., et al. *Cold regions science and technology*, Apr. 1985, 10(3), p.277-279, 13 refs.
Ambach, W.
Snow water content, Snow samplers, Moisture meters, Plastics, Dielectric properties.

46-5288
Proceedings.
Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992, Ottawa, Environment Canada, 1992, 818p., Refs. passim.
For selected papers see 46-5289 through 46-5307.
Oil spills, Oil recovery, Environmental protection, Ocean environments, Ice water interface, Impurities, Soil pollution, Water pollution, Environmental impact, Waste disposal, Countermeasures.

46-5289
Hybrid model to predict the entrainment and subsurface transport of oil.
Spaulding, M.L., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.67-92, 35 refs.
Odulo, A., Kolluru, V.S.
Oil spills, Environmental impact, Suspended sediments, Sediment transport, Ocean environments, Water pollution, Ocean currents, Ocean waves, Mathematical models.

46-5290
Laboratory testing of dispersants under arctic conditions.
Brandvik, P.J., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.123-134, 10 refs.
Moldestad, M.Ø., Daling, P.S.
Oil spills, Environmental protection, Surfactants, Ocean environments, Dispersions, Countermeasures, Environmental tests.

46-5291
Risk assessment initiatives in the U.S. Beaufort Sea.
Johnson, W.R., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.197-210, 7 refs.
Paluszkiewicz, T.
Oil spills, Environmental impact, Ocean environments, Air ice water interaction, Drift, Ice models, Mathematical models, Beaufort Sea.

46-5292
Assessment of the Transrec-350 mechanical recovery capacity of the oil spill response equipment in Prince William Sound.
Provant, S.G., Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.219-237, 4 refs.
Oil spills, Oil recovery, Environmental protection, Ocean environments, United States, Alaska, Prince William Sound.

46-5293
Response and management strategies utilized during the Kenai pipeline crude oil spill, Nikiski, Alaska.
Sienkiewicz, A.M., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.239-251, 7 refs.
O'Shea, K.
Oil spills, Oil recovery, Environmental protection, Ocean environments, United States, Alaska, Cook Inlet.

46-5294
Will specialized equipment and supplies needed for an oil spill response be available when you need them.
Goodman, R.H., Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.253-260, 22 refs.
Oil spills, Oil recovery, Environmental protection, Ocean environments.

46-5295
New test basin for experimental studies on oil spill in ice.
Wessels, E., Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.271-279.
Oil spills, Oil recovery, Environmental protection, Ocean environments, Ice water interface, Ice cover effect, Environmental tests, Test chambers.

46-5296
Alaska Coastal Communities Cooperative: the concept and feasibility.
Hann, R.W., Jr., Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.281-291.
Oil spills, Environmental protection, Oil recovery, Organizations, Regional planning, Shores, United States, Alaska.

46-5297
Task force on Oil Spill Preparedness: offshore implementation program.
Devenis, P.K., Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.307-314, 2 refs.
Oil spills, Environmental protection, Oil recovery, Offshore drilling, Organizations, Regional planning, International cooperation, Cost analysis.

46-5298
First results of airborne trials of a 64-channel laser fluorosensor for oil detection.
Dick, R., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.365-379, 9 refs.
Fingas, M.F.
Oil spills, Environmental protection, Ice water interface, Impurities, Water pollution, Detection, Airborne equipment, Aerial surveys, Remote sensing, Lasers, Spectroscopy, Lidar.

46-5299
Oil spill remote sensing sensors and aircraft.
Fingas, M., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.407-425, 48 refs.
Fruhwirth, M., Gamble, L.
Oil spills, Environmental protection, Ice water interface, Impurities, Water pollution, Detection, Airborne equipment, Aerial surveys, Remote sensing.

46-5300
Mechanical recovery of oil in ice.
Solsberg, L.B., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.427-437.
McGrath, M.
Oil spills, Oil recovery, Environmental protection, Ocean environments, Ice water interface, Impurities, Ice cover effect.

46-5301
North Slope mobile technology and its application to spill response.
Mabile, N.J., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.497-503.
Helinski, R.
Oil spills, Oil recovery, Environmental protection, Motor vehicles.

46-5302
Removal of petroleum-derived hydrocarbons from contaminated soils by solvent extraction.
Ladanowski, C., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.505-521, 4 refs.
Petti, L.
Oil spills, Oil recovery, Soil pollution, Environmental protection, Waste disposal, Soil chemistry, Peat.

46-5303
Viscosity and drag reduction for temporary storage and transfer of weathered crude oils and emulsions.
Buist, I.A., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.523-546, 23 refs.
Guenette, C.C., Potter, S.G., Bringloe, T.
Oil spills, Oil recovery, Environmental protection, Ocean environments, Petroleum transportation, Storage tanks, Viscous flow.

46-5304
In-situ burning of emulsions: the effects of varying water content and degree of evaporation.
Bech, C., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.547-559, 5 refs.
Sveum, P., Buist, I.A.
Oil spills, Environmental protection, Ice water interface, Impurities, Ice cover effect, Countermeasures, Waste disposal.

46-5305
Laboratory evaluation of biodegradation of crude oil contaminated tundra soil.
Schepart, B.S., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.689-714, 19 refs.
Hyzy, J.B., Jorgenson, M.T.
Oil spills, Soil pollution, Soil microbiology, Tundra, Environmental protection, Waste disposal, Soil chemistry.

46-5306
Cleanup and bioremediation of a crude-oil spill at Prudhoe Bay, Alaska.
Jorgenson, M.T., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.715-722, 5 refs.
Cater, T.C., Joyce, M.R., Ronzio, S.
Oil spills, Soil pollution, Soil microbiology, Tundra, Environmental protection, Waste disposal, Soil chemistry.

46-5307
Peat shorelines protection, cleanup and disposal guidelines.
Little, D.I., et al. Arctic and Marine Oil Spill Program Technical Seminar, 15th, Edmonton, Alberta, June 10-12, 1992. Proceedings, Ottawa, Environment Canada, 1992, p.801-818, 12 refs.
Owens, E.H., Buist, I.A., Marty, R.
Oil spills, Oil recovery, Soil pollution, Environmental protection, Waste disposal, Peat, Shores.

46-5308
Mechanism of growth of ice crystals in complex biological systems.
Novikov, A.N., et al. *Biophysics*, 1991, 36(1), p.119-124, Translated from Biofizika. 6 refs.
Kuleshova, L.G., Linnik, T.P.
Cryobiology, Ice crystal structure, Antifreezes, Solutions, Supercooling, Ice crystal growth, Phase transformations, Statistical analysis, Ice water interface, Temperature effects.

46-5309
Summer 1987 floods in the glacial basins of the Pennine Alps. [Les crues de l'été 1987 dans les bassins versants glaciaires des Alpes Pennines].
Rey, Y., et al. *La houille blanche*, 1990, 45(5), p.349-353, In French with English summary. 6 refs. For another version see 45-370.
Dayer, G.
Glacier melting, Precipitation (meteorology), Runoff, River basins, Flooding, Glacial hydrology.

46-5310
Remote sensing of glaciers of the French Alps-1986, 1987 and 1988. [Télédétection appliquée au suivi des glaciers des Alpes françaises (annees 1986, 1987 et 1988)].
Dedieu, J.P., et al. *La houille blanche*, 1990, 45(5), p.355-358, In French with English summary. 7 refs.
Reynaud, L.
Glacier mass balance, Spaceborne photography, Glacier surveys, Radiometry, Snow line, Firn, Periodic variations, Glaciology.

46-5311
Glacier mass balance determination in the accumulation zone by *in situ* measurements of radioactivity from Chernobyl. [Détermination du bilan glaciaire en zone d'accumulation par mesure *in situ* de la radioactivité due à Tchernobyl].
Pinglot, J.-F., et al. *La houille blanche*, 1990, 45(5), p.359-361, In French with English summary. 7 refs. For another version see 43-4489.
Pourchet, M.
Glacier mass balance, Fallout, Ice spectroscopy, Radioactivity, Ice composition, Glacier surveys, Gamma irradiation.

46-5312
Estimates of sea ice thickness distribution using observations and theory.
Thorndike, A.S., *Journal of geophysical research*, Aug. 15, 1992, 97(C8), p.12,601-12,605, 3 refs.
Sea ice, Ice cover thickness, Distribution, Ice growth, Mass balance, Pressure ridges, Thermodynamics, Mathematical models, Periodic variations.

46-5313
Description of water types on the Mackenzie Shelf of the Beaufort Sea during winter.
Moore, R.M., et al. *Journal of geophysical research*, Aug. 15, 1992, 97(C8), p.12,607-12,618, 30 refs.
Melling, H., Thompson, K.R.
Oceanography, Sea water, Chemical properties, Salinity, Ice melting, Water chemistry, Hydrologic cycle, Seasonal variations, Winter.

46-5314
Internal wave observations from the arctic environmental drifting buoy.
Plueddemann, A.J., *Journal of geophysical research*, Aug. 15, 1992, 97(C8), p.12,619-12,638, 55 refs.
Sea ice, Drift, Drift stations, Ocean currents, Velocity measurement, Subglacial observations, Oceanographic surveys, Fluid dynamics, Design, Ice cover effect.

46-5315
Diurnal tides near the Yermak Plateau.
Padman, L., et al. *Journal of geophysical research*, Aug. 15, 1992, 97(C8), p.12,639-12,652, 39 refs.
Plueddemann, A.J., Muench, R.D., Pinkel, R.
Ocean currents, Hydrography, Tidal currents, Diurnal variations, Sea ice, Topographic effects, Ice deformation, Bottom topography, Ice water interface.

46-5316
Digging frozen ground with a ripper bucket.
Sellmann, P.V., et al. *U.S.Army Cold Regions Research and Engineering Laboratory. Special report*, June 1992, SR 92-15, 9p., ADA-254 304, 10 refs.
Brockett, B.E.
Excavation, Cold weather construction, Construction equipment, Frozen ground strength.
To improve the digging capability of small excavators and backhoes in hard and frozen ground, a bucket of special design was selected from among a variety of attachments. This bucket cuts and rips the frozen ground, as lip teeth and a set of staggered teeth attached to the back of the bucket move through an arc during bucket rotation. Digging observations were made using a small mini-excavator and an Army tractor (SEE) with a rear-mounted backhoe. Frozen ground was excavated at several sites under conditions impossible for a conventional bucket. A large variation in excavation rates (3 to 30 cu yd/hr (2.3 to 23 cu m hr)) was observed, depending on material type, frost thickness, sharpness of the cutters and operator experience.

46-5317
Analysis of a passive infrared perimeter security system.
Lacombe, J., et al. *U.S.Army Cold Regions Research and Engineering Laboratory. Report*, June 1992, CR 92-11, 32p., ADB-166 114, 11 refs.
Peck, L.
Detection, Thermal radiation, Thermal analysis, Sensors.
An assessment has been made of the capabilities of a passive infrared intrusion detection sensor (PIR). The study involved a series of field tests and the development of a sensor model. The field tests were conducted during the spring of 1991 at the South Royalton Intrusion Detection Systems (SOROIDS) test site in Vermont. These tests documented the ability of two ELTEC Model 862-71C PIRs to detect a heated 0.3 m (1-ft) diameter target as it moved through the surveillance zone of the two sensors. Thermal contrast and speed thresholds required to alarm the sensors were identified from the test data using a binary decision-tree classification process. A simple model has been developed that predicts sensor performance based on target and background temperatures, target dimensions and target speed. Results from analyses of the heated target test data appear to verify its accuracy. The model has been exercised for a variety of input conditions to demonstrate its general utility. Limitations of the model have been identified and tasks proposed to improve its accuracy, extend its use for slow-moving targets (i.e., speeds less than 0.5 m/s), and incorporate the effects of natural obscuration. By linking this model to surface temperature thermal algorithms, it should be possible to predict thermal contrast (and sensor performances) based on environmental inputs.

46-5318
Passive techniques for manipulating field soil temperatures.
Marion, G.M., et al. *U.S.Army Cold Regions Research and Engineering Laboratory. Special report*, June 1992, SR 92-14, 11p., ADA-254 303, 8 refs.
Pidgeon, D.E.
Soil temperature, Global change, Climatic changes, Frozen ground temperature.
Recent concerns about global climate change have focused attention on the methodology for manipulating field soil temperatures. The objective of this study was to evaluate several simple, inexpensive, passive systems for changing soil surface temperature in the field. Four classes of treatments were evaluated, including plastic ground covers, fabric ground covers, fabric greenhouses, and open-top chambers. In general, treatments raised daytime maximums and lowered nighttime minimums. In some cases these opposite effects balanced, and there was no change in mean daily temperature. Five treatments changed mean daily temperature by at least +/- 1.0 C; these included black plastic (-2.6 C), two clear plastic treatments (+1.0 C), Reemay greenhouses (+1.0 C), and Reemay ground covers (+2.4 C). A multiple linear regression analysis of maximum temperatures indicated that the temperature differential between treatment and control plots was most strongly controlled by solar radiation (>time>wind speed). Differences among treatments were greatest on sunny days and minimal on rainy days. Both the present study and previous studies suggest that these passive systems can alter mean daily soil surface temperatures by, at most, +/- 2.5 C.

46-5319
Sediment-overlying water relationships affecting wintertime dissolved oxygen conditions in the Big Eau Pleine Reservoir, Wisconsin.
James, W.F., et al. *U.S. Army Waterways Experiment Station. Technical report*, July 1992, W-92-2, 30p. + appends., 32 refs.
Eakin, H.L., Gunnison, D., Barko, J.W.
Reservoirs, Water chemistry, Bottom sediment, Nutrient cycle, Ice cover effect, Cold weather operation, Water supply, Oxygen, Aeration, United States—Wisconsin.

46-5320
Arctic Ocean record: key to global change (initial science plan).
Nansen Arctic Drilling Program NAD Science Committee, *Polarforschung*, 1991 (Pub. 1992), 61(1), p.1-102, With German summary. Refs. p.70-76.
Bottom sediment, Offshore drilling, Paleoclimatology, Global warming, Oceanographic surveys, Site surveys, Air ice water interaction, Drill core analysis, Research projects.

46-5322
Limnology of Big Lake, south-central Alaska, 1983-84.
Woods, P.F., *U.S. Geological Survey. Water-supply paper*, 1992, No.2382, 108p., 57 refs.
Lake water, Limnology, Nutrient cycle, Water pollution, Lake ice, Ice cover effect, Biomass, Water chemistry, United States—Alaska—Big Lake.

46-5323
Overview of federal science and technology activities in the North.
Canada. Indian and Northern Affairs. Circumpolar and Scientific Affairs Directorate, *Publication series*, Apr. 1992, No.92-06, 28p., With French summary, 19 refs.
Organizations, Research projects, Canada.

46-5324
Analytical method for calculating the pure ridge resistance encountered by ships in first year ice ridges.
Keinonen, A.J., *Helsinki University of Technology. Report*, 1979, No.17, 114p., Ph.D. thesis. 43 refs.
Pressure ridges, Ice navigation, Ice solid interface, Metal ice friction, Ice loads, Ice pressure, Mathematical models.

46-5325
Instructions for making snow observations.
U.S. Army Corps of Engineers. Snow, Ice, and Permafrost Research Establishment, *SIPRE instruction memorandum*, 1953, No.1, MP 3126, 8p.
Snow surveys, Snow cover structure, Snow surface, Snow hardness, Snow crystal structure.

46-5326
Impulse response from snow covered ground.
Lee, S.M., et al. Workshop on Sound Propagation in Forested Areas and Shelterbelts, Nijmegen, Netherlands, Mar. 3-6, 1986. Proceedings. Edited by M.J.M. Martens. Nijmegen, Catholic University, 1986, p.57-72, 16 refs.
Rogers, J.C.
Snow acoustics, Snow cover effect, Sound waves, Sound transmission, Attenuation, Forest land, Vegetation factors.

46-5327
Air sparging to remove dissolved hydrocarbons from river water under winter ice conditions.
Peake, E., *Spill technology newsletter*, Mar.-Apr. 1980, 5(2), p.44-54, 20 refs.
Oil spills, Oil recovery, Water pollution, Aeration, Countermeasures, Ice cover effect, River ice, Water chemistry.

46-5328
On the incorporation of unconsolidated sediments in basal ice: present-day examples.
Tison, J.L., et al. *Zeitschrift für Geomorphologie. Supplementband*, Jan. 1989, Vol.72, Weathered mantles (saprolites) over basement rocks of high latitudes. Edited by A. Godard, p.173-183, With French summary. 14 refs.
Souchez, R.A., Lorrain, R.
Glacier beds, Glacial erosion, Moraines, Sediment transport, Glacier ice.

46-5329
Air power on ice.
Vietmeyer, N., *Air and space*, Mar. 1989, 3p.
Ice islands, Ice (construction material), Marine transportation, Ice runways, Artificial ice, Military operation, Military transportation, History.

46-5330
Vibration in percussive drill rods.
Dutta, P.K., MP 3127, International Conference on Vibration Problems of Mathematical Elasticity and Physics, 1st, Jalpaiguri, India, Oct. 20-23, 1990. Proceedings. Edited by M.M. Bannerjee and P. Biswas. Jalpaiguri, A.C. College, 1990, 13p., 12 refs.
Rock drilling, Percussion drilling, Damping, Vibration, Noise (sound), Shock waves, Stresses, Mathematical models.

46-5331
Theory of strength degradation of unidirectional fiber composites at low temperature.
Dutta, P.K., MP 3128, Industry-University Advanced Materials Conference II, Denver, CO, Mar. 6-9, 1989. Proceedings. Edited by F.W. Smith, Golden, CO, Colorado School of Mines, Advanced Materials Institute, 1989, p.647-662, 19 refs.
Composite materials, Low temperature tests, Cold stress, Resins, Polymers, Tensile properties, Cold weather performance, Temperature effects, Mathematical models.
Recent studies have shown that unidirectional polymeric composites, when loaded at low temperature in the direction of the fibers, fail at lesser loads than when loaded at room temperature. Evidence of such strength reduction in the cold has been observed in fiberglass-epoxy, carbon-epoxy and Kevlar-epoxy composites. A hypothesis is put forward based on the development of stress concentrations in fibers embedded in the cold hardened matrix. At room temperature the resin is relatively less stiff, it tends to allow the wavy fibers to align in the direction of loading and share the load uniformly. At low temperature the resin is stiffer, since the fibers cannot align, the waviness persists and local stress concentration causes the fibers to fail.

46-5332
Great Lakes surface water temperature climatology.
Irbe, G.J., *Environment Canada. Atmospheric Environment Service. Climatological studies*, 1992, No.43, 215p., In English and French. 31 refs.
Water temperature, Air water interactions, Surface temperature, Lake water, Lake ice, Remote sensing, Thermal regime, Seasonal variations, Meteorological data, Great Lakes.

46-5333
Just a little ice.
Garrison, P., *Flying*, Sep. 1992, 119(9), p.48-51.
Aircraft icing, Accidents, Blowing snow, Ice accretion, Countermeasures, Ice detection, Safety, Surface roughness.

46-5334
Protecting fresh concrete from freezing weather.
Suprenant, B.A., *Aberdeen's concrete construction*, Feb. 1992, 37(2), p.126-128, 5 refs.
Concrete placing, Cold weather construction, Concrete freezing, Winter concreting, Frost protection, Specifications, Countermeasures, Temperature effects.

46-5335
Variation of rock-forming metals in sub-annual increments of modern Greenland snow.
Hinkley, T.K., *Atmospheric environment*, Sep. 1992, 26A(13), p.2283-2293, 42 refs.
Glacier surfaces, Snow composition, Snow stratigraphy, Snow impurities, Dust, Metals, Chemical composition, Seasonal variations, Sampling, Geochemistry.

46-5336
Generation and atmospheric heat exchange of coastal polynyas in the Weddell Sea.
Kottmeier, C., et al, *Boundary-layer meteorology*, Aug. 1992, 60(3), p.207-234, 30 refs.
Engelbart, D.
Sea ice, Polynyas, Air ice water interaction, Wind factors, Drift, Heat flux, Turbulent boundary layer, Thermodynamics, Ice edge, Turbulent exchange, Antarctica—Weddell Sea.
The forcing mechanisms for antarctic coastal polynyas and the thermodynamic effects of existing polynyas were studied by means of an air-sea-ice interaction experiment in the Weddell Sea in Oct. and Nov. 1986. From the momentum balance of drifting sea ice, a forcing diagram is constructed, which relates ice motion to the surface-layer wind vector and to the geostrophic ocean current vector. In agreement with the data, wind forcing dominates when the wind speed at a height of 3 m exceeds the geostrophic current velocity by a factor of at least 33. This condition within the ocean regime of the antarctic coastal current usually is fulfilled for wind speeds above 5 m/s at a height of 3 m. The turbulent heat exchange between sea ice and polynya surfaces is derived from surface-layer wind and temperature data, from temperature changes of the air mass along its trajectory and from an application of the resistance laws for the atmospheric planetary boundary layer (PBL). The turbulent heat flux averaged over all randomly distributed observations in coastal polynyas is 143 W/sq m, a value significantly different over pack ice and shelf ice surfaces, where downward fluxes prevail. The large variances of turbulent fluxes can be explained by variable wind speeds and air temperatures. The heat fluxes are also affected by cloud feedback processes, and vary in time due to the formation of new ice at the polynya surface. Maximum turbulent fluxes of more than 400 W/sq m result from strong winds and low air temperatures. The heat exchange is similarly intense in a narrow zone close to the ice front, when under weak wind conditions a local circulation develops, and cold air associated with strong surface inversions over the shelf ice is heated above the open water. (Auth. mod.)

46-5337
Adaptations to low temperatures.
Hällgren, J.E., et al, Plant biology, Vol.12: Stress responses in plants: adaptation and acclimation mechanisms. Edited by R.G. Alscher et al, New York, Wiley-Liss, Inc., 1990, p.265-293, Refs. p.285-293.
Öquist, G.
Plant physiology, Plants (botany), Cold stress, Cold tolerance, Acclimatization, Light effects, Temperature effects, Physiological effects.

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Summerfield, M.A., United Kingdom, Longman Scientific & Technical, 1991, 537p. (pertinent p.260-311), Refs. passim.
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46-5339
Optimal control of ice harvesting thermal energy storage systems.
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DLC TJ163.7.I57 1990
Air conditioning, Refrigeration, Ice makers, Performance, Electric power, Defrosting, Heat recovery, Heat transfer.

46-5340
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DLC TJ163.7.I57 1990
Air conditioning, Ice makers, Artificial ice, Electric power, Ice (water storage), Performance, Heat recovery, Cooling systems, Synthetic materials.

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